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NASA SP-7011 (159)

# AEROSPACE MEDICINE AND BIOLOGY

## A CONTINUING BIBLIOGRAPHY

## WITH INDEXES

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## ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

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| STAR (N-10000 Series) | N76-26143—N76-28153 |
| IAA (A-10000 Series) | A76-35228—A76-38272 |

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NASA SP-7011 (159)

# AEROSPACE MEDICINE AND BIOLOGY

## A CONTINUING BIBLIOGRAPHY WITH INDEXES

## (Supplement 159)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in September 1976 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

*Scientific and Technical Information Office*
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# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 257 reports, articles and other documents announced during September 1976 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1976 Supplements.

# AVAILABILITY OF CITED PUBLICATIONS

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All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies are available at $5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche[1] are available at the rate of $1.50 per microfiche for documents identified by the # symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is $1.00. Please refer to the accession number, e.g., (A76-13400), when requesting publications.

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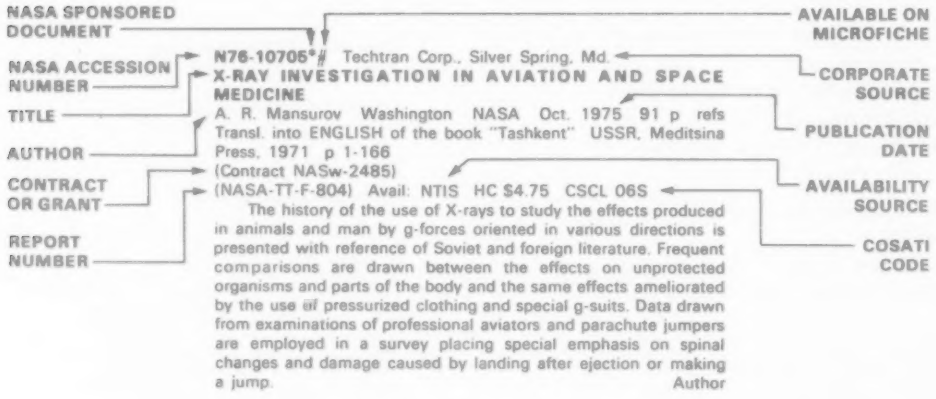
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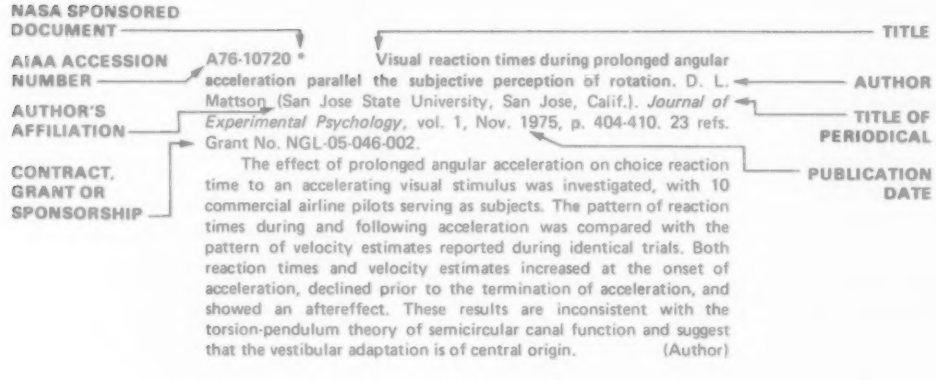
TITLE
X-RAY INVESTIGATION IN AVIATION AND SPACE MEDICINE
AUTHOR
A. R. Mansurov Washington NASA Oct. 1975 91 p refs Transl. into ENGLISH of the book "Tashkent" USSR, Meditsina Press, 1971 p 1-166
PUBLICATION DATE
CONTRACT OR GRANT
(Contract NASw-2485)
AVAILABILITY SOURCE
REPORT NUMBER
(NASA-TT-F-804) Avail: NTIS HC $4.75 CSCL 06S
COSATI CODE
The history of the use of X-rays to study the effects produced in animals and man by g-forces oriented in various directions is presented with reference of Soviet and foreign literature. Frequent comparisons are drawn between the effects on unprotected organisms and parts of the body and the same effects ameliorated by the use of pressurized clothing and special g-suits. Data drawn from examinations of professional aviators and parachute jumpers are employed in a survey placing special emphasis on spinal changes and damage caused by landing after ejection or making a jump.
Author

## TYPICAL CITATION AND ABSTRACT FROM *IAA*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TITLE
AIAA ACCESSION NUMBER
A76-10720 * Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation. D. L. Mattson (San Jose State University, San Jose, Calif.). Journal of Experimental Psychology, vol. 1, Nov. 1975, p. 404-410. 23 refs.
AUTHOR
AUTHOR'S AFFILIATION
TITLE OF PERIODICAL
CONTRACT, GRANT OR SPONSORSHIP
Grant No. NGL-05-046-002.
PUBLICATION DATE
The effect of prolonged angular acceleration on choice reaction time to an accelerating visual stimulus was investigated, with 10 commercial airline pilots serving as subjects. The pattern of reaction times during and following acceleration was compared with the pattern of velocity estimates reported during identical trials. Both reaction times and velocity estimates increased at the onset of acceleration, declined prior to the termination of acceleration, and showed an aftereffect. These results are inconsistent with the torsion-pendulum theory of semicircular canal function and suggest that the vestibular adaptation is of central origin.
(Author)

AEROSPACE MEDICINE
AND BIOLOGY
*A Continuing Bibliography (Suppl. 159)*

OCTOBER 1976

## IAA ENTRIES

6-35715 The problem of habitability in spaceships. Iu. edov, S. N. Zaloguev, and V. P. Savina. In: Space activity impact science and technology. Oxford, Pergamon ss, Ltd., 1976, p. 207-211. 8 refs.

Specific aspects of the habitability problem in spacecraft are ewed, emphasizing air contamination by trace impurities and cts of reduced gravity on the bacterial aerosol. It is shown that ired air is one of the main sources of air contamination in cecraft and that the concentration of trace impurities in expired is affected by microclimatic conditions, the composition and oric content of food products, the motor activity of crew mbers, and environmental factors such as high temperature and midity. The growth and survivability of microbes during long-term ce flights are discussed along with hygienic measures that have n taken to reduce the entry of pathogenic microorganisms into cabin atmosphere. The problem of the biological compatibility of cecraft crew members is considered. F.G.M.

6-35744 Man in space (Chelovek v kosmose). Edited by G. Gazenko (Akademiia Nauk SSSR, Moscow, USSR) and H. stedt (Kungl. Karolinska Institutet, Stockholm, Sweden). scow, Izdatel'stvo Nauka, 1974. 440 p. In Russian, English, and nch.

The papers deal with the medical aspects of prolonged space hts (including the physiological and psychological aspects of ptation to the space environment and readaptation to terrestrial ditions); the problem of artificial gravitation; the mechanisms derlying combined stress effects, such as hypokinesia, nervous otional stress, insomnia, etc. A special chapter is devoted to instrumentation and methods of detecting stress and fatigue ects. V.P.

6-35764 # Second expedition of the orbital station yut-4 - Some results and problems of medical studies (Vtoraia peditsiia orbital'noi stantsii 'Saliut-4' - Nekotorye itogi i zadachi ditsinskikh issledovanii). O. G. Gazenko and A. D. Egorov. *ademiia Nauk SSSR, Vestnik*, no. 4, 1976, p. 25-36. In Russian.

The paper consideres the physiological state of the crew of yut-4 during and after flight and presents results of medical estigations. The medical and biological aspects discussed include ptation to weightlessness, the operation of the vestibular organs d space orientation, light flashes with eyes closed, sleep dis-bances, migrating circadian rhythm, work capacity, heart func-n, respiration rate, electrocardiography, hemodynamic response, diovascular response and muscular function. B.J.

6-35767 # Trends of the search for living microscopic anisms beyond the earth (Shliakhi poshukiv zhivikh mikrosko-hnikh istot poza zemleiu). L. I. Rubenchik. *Akademiia Nauk rains'koi RSR, Visnik*, vol. 40, Mar. 1976, p. 46-51. 25 refs. In rainian.

The current status of space research directed at detecting traces of extraterrestrial life is briefly reviewed. The principal analysis techniques that have been applied to lunar samples are examined, along with possible directions of future Martian research. V.P.

A76-35892 # Psychoacoustical equivalents to neurophysiological 'tuning curves' obtained by the method of subsequent masking (Psychoakustyczne odpowiedniki neurofizjologicznych 'krzywych strojenia' uzyskane metoda maskowania następczego). A. Jaroszewski and A. Rakowski (Wyzsza Szkola Muzyczna, Warsaw, Poland). *Archiwum Akustyki*, vol. 11, no. 2, 1976, p. 159-166. 20 refs. In Polish.

The authors describe a method for measuring psychoacoustical tuning curves in post-stimulus masking and present the results of testing three subjects involving about 6500 evaluations. Tuning curve slopes attaining values of 1040-2200 dB per octave were found for a characteristic frequency of 1 kHz. By comparing these results with the researches of other investigators, the authors have established the likely importance of the role of the cochlea or higher nerve centers in the perception of frequency. P.T.H.

A76-35893 # Determination of the intensity in a focused ultrasonic beam by an electrodynamic and capacitance method as applied to automatic visualization of the structure of the eye (Wyznaczenie natężenia w zogniskowanej wiazce ultradzwiekowej za pomoca metody elektrodynamicznej i pojemnosciowej w zastosowaniu do automatycznej wizualizacji struktur oka). L. Filipczynski, G. Lypacewicz, J. Salkowski, and T. Waszczuk (Polska Akademia Nauk, Instytut Podstawowych Problemow Techniki, Warsaw, Poland). *Archiwum Akustyki*, vol. 11, no. 2, 1976, p. 189-198. In Polish.

A76-35897 Spacelab environmental control/life support system-design safety. R. Gärtner (Dornier-System GmbH, Friedrichshafen, West Germany). *Journal of the Astronautical Sciences*, vol. 23, July-Sept. 1975, p. 205-224. 5 refs.

The paper traces the development of safety requirements and design features from the Apollo Lunar Module/Command Module, to Skylab, to Shuttle and ultimately to Spacelab. It is shown how these requirements are applied to the Spacelab environmental control/life support system which consists of the Atmosphere Storage and Control Section and the Atmosphere Revitalization Section. The Spacelab hazard level classification (catastrophic, critical and controlled) along with failure analysis tables listing hazardous failure modes and corrective actions. Fire prevention and rescue capability are also discussed. B.J.

A76-35901 Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Edited by H. Abel (St. Josefs Hospital, Wiesbaden, West Germany). Basel, S. Karger AG (Advances in Cardiology. Volume 16), 1976. 586 p. $49.25.

Advances in physiological, pathophysiological, and diagnostics research in electrocardiology are outlined. Six major areas are discussed: electrophysiological events in the myocardium and cardiac electric field, surface mapping and lead systems, computer applica-

tions in electrovectorcardiography, clinical investigations and experience in hypertrophy and VCG, myocardial infarction, and intraventricular conduction and other related problems. Featured topics include the electric field of the cardiac repolarization in physical work, biophysical implications of orthogonal lead electrocardiology, ECG/VCG automatic classification systems, parameters of left and right ventricular hypertrophy in vectorcardiograms, and VCG recognition and differentiation of myocardial infarction. Present-day dissatisfaction with clinical vectorcardiography is related to the arbitrary limited surface exploration and to the contamination of the records by noise or instrumental distortion.

S.D.

A76-35902 **Action potential of the cardiac cell and the electrocardiogram.** H. Antoni (Freiburg, Universität, Freiburg im Breisgau, West Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 6-17. 25 refs.

The relationship between the action potential of the cardiac cell and the ECG is known to be a matter of extreme complexity. The paper discusses the ionic genesis of the cardiac action potential, the electromotive forces generated by the wave of excitation, and the useful contributions of single fiber electrophysiology to clinical electrocardiography. It is shown that the emf generated at a given time by a homogeneously excited segment of cardiac muscle is dependent on the shape of the action potential and on its conduction velocity, on the length of the excited section, and some other factors. At present the most useful contribution of cellular electrophysiology to electrocardiography may concern the genesis and mechanisms of cardiac arrhythmias rather than an interpretation of electrocardiographic deflections. S.D.

A76-35903 **Possibilities of electrocardiography in the future.** H. Schaefer (Heidelberg, Universität, Heidelberg, West Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 18-26. 24 refs.

The single myocardial fiber as an elementary generator and electric source of ECG, the electrical field of the heart, and the clinical interpretation of ECG are examined along with possible future developments in the field of electrocardiography. Whatever is recordable as an ECG is nothing but the vectorial sum of all elementary generators with their projections on the chosen lead vector. Functional deviations impairing correct interpretation of ECG are identified. Future development should be directed toward improving the methods of translating the language of electrical events on the surface of the body into information on functional or morphological events in the interior of the heart. Particular attention is devoted to improvements to be made in the standard ECG, the ECG as a screening method, description of vectorial data, mapping of electric potentials on the chest surface, and computer analysis of recorded electrocardiographic data. S.D.

A76-35904 **Multiple dipole electrocardiography in ischaemic heart disease.** R. H. Baxter, A. Irving, A. Escarous, P. W. Macfarlane, and T. D. V. Lawrie (Glasgow, University, Glasgow, Scotland). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 43-46.

A computer-aided technique known as multiple dipole electrocardiography is described, which has the advantage of detecting electrical activities in discrete areas of the myocardium during ventricular depolarization. The multiple dipole ECG is obtained by recording 126 unipolar leads with respect to the Wilson central terminal. A model of ventricular depolarization is developed with the myocardium divided into ten arbitrary areas - three in the right ventricle, two in the septum, and five in the left ventricle. The electrical activity of each of these areas is represented by an electrical dipole with a fixed direction as the mean direction of the normal spread of activation in the area that the dipole represents. The results obtained so far on normal patients and patients with proven coronary artery disease confirm the validity of the model used and suggest that the multiple dipole ECG may be of clinical value in selective cases where standard ECG findings are normal or equivocal. S.D.

A76-35906 **Comparison between conventional ECGs simultaneously recorded and those reconstructed from Frank lead system.** C. Zywietz, H. Abel, H.-P. Mock, and B. Rosenbach (Hannover, Medizinische Hochschule, Hanover, West Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 82-86. 5 refs. Research supported by the Bundesministerium für Forschung und Technologie. BMFT Project DVM-001.

A76-35907 **Age differences in the spatial vectors and vectorcardiogram utilizing various orthogonal electrocardiographic lead systems.** G. Arsenescu, M. Sabau, B. X. Hasu, and G. Szots (Institutul de Medicina si Farmacie, Tirgu-Mures, Rumania). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 108-110.

A76-35908 **Computers in clinical electrocardiology - Is vectorcardiography becoming obsolete.** P. M. Rautaharju, H. W. Blackburn, H. K. Wolf, and M. Horacek (Dalhousie University, Halifax, Nova Scotia, Canada; Minnesota, University, Minneapolis, Minn.). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 143-156. 20 refs.

Contrasting functional varieties of ECG analysis programs are discussed along with critical current problems in computer analysis of ECG. In assessing the potential of computer interpretations of ECGs, some trends are emerging although a number of fundamental questions remain unanswered. The characteristics of single versus multiple lead ECG, standard versus vector lead programs, and probabilistic versus deterministic programs are examined. The task of handling multivariate information is highly complex even with computers and with the best available statistical procedures, which gives rise to the problems of data base selection and reduction of redundancy. Most presently available ECG programs are deterministic rather than probabilistic in the sense that they are designed to interpret ECGs according to some set of currently accepted electrocardiographic criteria. Old concepts of strict orthogonality in vectorcardiography should be de-emphasized to create a new basis for computer-aided ECG interpretation involving more heuristic models of cardiac activity. S.D.

A76-35909 **Automated comparison of serial electrocardiograms.** H. V. Pipberger, R. A. Dunn, and H. A. Pipberger (U.S. Veterans Administration Research Center for Cardiovascular Data Processing; George Washington University, Washington, D.C.). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 157-165. 5 refs. Grant No. NIH-HL-15047.

The paper describes a completely automated ECG analysis system for rapid and comprehensive evaluation of ECG changes which may have taken place between consecutive tracings. Use is

made of a storage and retrieval system where the main considerations are speed, practicality, and cost. All ECGs recorded from hospitalized patients are stored on disk so that when the number of tracings exceeds three for an individual, the program retains only the first and the two most recent ones. The stored record incorporates 150 ECG measurements including results of cardiac rhythm analysis and posterior probabilities calculated from a multivariate likelihood ratio and the digitized signal of one cardiac cycle selected as most representative of the 10-sec recording. A different analysis is developed for long-term ECG changes where it is important to recognize trends. Illustrative examples are provided. S.D.

A76-35910 **Further reflections on automated ECG interpretation.** P. W. MacFarlane, T. P. Taylor, and T. D. V. Lawrie (Glasgow, University, Glasgow, Scotland). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 166-170.

The present status of automated ECG interpretation in Europe is reviewed, with particular reference to the research work carried out by the authors. The discussion covers hardware, software, arrhythmia analysis, basic interpretation of ECG, and serial analysis. An increasing confidence in the accuracy of computer interpretation of cardiac rhythm exists since only 5 in every 100 ECGs from a general hospital population is wrongly reported, so that ECGs should be checked before distribution from the computer center. It is suggested that an ECG should be interpreted in a conventional manner, i.e., with a first generation program which can still make more objective use of many more criteria than a cardiologist can remember. Reports of sequential changes can be made with confidence and in many cases false-positive findings are inhibited by comparison of tracings recorded a few days apart. S.D.

A76-35911 **Estimation of variance components in the automated analysis of vectorcardiograms.** J. Michaelis, A. Axter, and M. Lutz (Universitätsklinik, Mainz, West Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 171-175. Research supported by the Bundesministerium für Forschung und Technologie. BMFT Project DVM-5,302.

The paper studies the amount of intra-individual variability caused by short-time variability, time of day variability, day-to-day variability, dislocation of electrodes and measurement errors from vectorcardiograms recorded on analog tape from 18 healthy students aged 19-25 years by the Frank and McFee lead systems. After A/D conversion, automated analysis of the vectorcardiograms is performed by the program of Pipberger, 1972 version. Variance components are estimated for 27 variables with special diagnostic relevance and compared with those that are due to interindividual variability. It is found that the influence of unproper electrode position, 5-min variability, day-to-day variability, and time of day variability is relatively small. The small intra-individual variability resulted in a great stability of multivariate analysis, so that it seems unnecessary to consider the sources of intra-individual variability in the planning of clinical and epidemiological studies. S.D.

A76-35912 **Accuracy and beat-to-beat variation in ECG computer measurements.** D. Borovsky and C. Zywietz (Hannover, Medizinische Hochschule, Hanover, West Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 176-181. Research supported by the Bundesministerium für Forschung und Technologie. BMFT Project DVM-001.

The separation of observed and biological variability is essential for proper utilization of available statistical analysis methods used for automated ECG/VCG analysis, since the observed variability may be due both to a physiological factor and to performance of data acquisition, measurement precision, and observer variability. Attention is focused on variation of time measurements, intra-observer variability, true beat-to-beat variability, and amplitude variations. Due to the functional dependency of amplitude and time measurements every inaccuracy in time measurements will necessarily influence amplitude measurements. Beat-to-beat variability of time measurements is presented in graphic form, including the maximal absolute deviations of the total measured variability of all time intervals, intra-observer variability for all wave recognition points and calculated or true variability for all time measurements. Time measurement variability is greater in the P wave. S.D.

A76-35913 **Modularity in VCG/ECG-processing systems.** J. S. Duisterhout, J. H. van Bemmel, C. A. Distelbrink, S. J. Hengeveld, G. van Herpen, J. L. Talmon, T. Plokker, and R. A. F. Pronk (Nederlandse Centrale Organisatie TNO, Medisch-Fysisch Instituut, Utrecht, Netherlands). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 186-189.

Discrepancies in existing VCG/ECG processing systems can be caused by the fact that the computer classification logic is incomplete or differs from the physician's logic and by errors introduced in the signal analysis by the computer. The paper discusses the design specifications, system structure, and module description of a modular VCG/ECG processing system consisting of a core resident main program and input module and 12 modular analysis and classification modules. The advantage of the system over conventional processing systems is that each module can be evaluated separately and easily replaced by another version as long as the input and output requirements are met. Three different stages now being used to test the system are outlined. S.D.

A76-35914 **Diagnostic variability of different ECG programs.** G. Arabin, J. Dudeck, W. Höbel, and H.-U. Valk (Giessen, Universität, Giessen, West Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 190-193.

One possible measurement of the reliability of an ECG program is the repeating variability defined as the variability of measurements and diagnostic statements or decisions between the analysis of two ECGs recorded under the same conditions, i.e., recorded one after the other within a short time interval and without moving the electrodes. Using the same set of ECG data one is able to compare the repeating variability of two ECG programs. It is hypothesized that the influence of repeating variability on diagnostic reliability is much smaller in programs using the statistical approach to find the diagnosis than in decision-tree programs. Some preliminary results on the measurements of the repeating variability of the Pipberger program in its 1972 version are presented. It is shown that the determination of repeating variability seems to be a very useful means to estimate the performance of an ECG program and that in the Pipberger program the repeating variability of measurements and diagnostic probabilities are in an acceptable range for practical applications. S.D.

A76-35915 **Computer interpretation of electrocardiograms and vectorcardiograms.** J. Enderle, M. Telerman, L. Pordy, K. Chesky, and H. Jaffe (Hôpital Universitaire Brugmann, Brussels, Belgium; Mount Sinai Hospital; New York University, New York, N.Y.). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 194-202.

Performance results are presented for an automated method of computer ECG/VCG analysis of over 23,000 cases. The method simulates clinical analysis by cardiologists and utilizes fixed criteria established by an international board of cardiographers. These criteria have been updated several times since the start of research work in 1969. Details of errors in rhythm and contour statements are tabulated and discussed. Several combined diagnostics are correctly made by the computer in most pathological cases, where infarcts are often associated with conduction disturbances and/or ventricular or atrial hypertrophies, rhythm disturbances, ST and/or T abnormalities, and the like. It is concluded that the computer system proves to be a useful clinical and research tool for the modern automated ECG laboratory. S.D.

**A76-35916 Diagnostic reliability of ECG processing by multivariate analysis.** C. Brohet (Minnesota, University, Minneapolis, Minn.) and H. G. Richman (U.S. Veterans Administration Hospital, Minneapolis, Minn.). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 209-213. 8 refs.

Results are presented for the overall diagnostic performance of an ECG analysis system based on the Pipberger program where little modification of the program's basic probabilistic functions would be necessary. The conditions and methods of evaluation are such that the clinical setting where the study is performed is independent of the program developers, there is no selection of ECGs, and the physician's interpretation is utilized as one criterion for assessing the diagnostic reliability of the program adopted. The advantage of the multivariate statistical approach used by this program for ECG diagnostic classification is that by using independent clinical information to arbitrate all equivocal cases, a significant increase in the diagnostic agreement can be reached which is greater than that resulting from the deterministic approach used by the physician. The program showed excellent sensitivity for atrial fibrillation, with good sensitivity and specificity for diagnosis of atrial abnormalities. S.D.

**A76-35917 Comparison of different algorithms for P-onset and P-offset recognition in ECG programs.** S. Klusmeier, H. Klinkers, P. Friedrichs, and C. Zywietz (Hannover, Medizinische Hochschule, Hanover, West Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 221-226. Research supported by the Bundesministerium für Forschung und Technologie. BMFT Project DVM-001.

Three P-wave detection methods were applied to vectorcardiograms (VCG). The first approach is a threshold method based on the spatial velocity; amplitudes and slopes in individual leads are included for the detection of small P-waves. The resulting wave recognition points are checked for plausibility and corrected using a modified procedure. In the second approach, the number of times the measured value of the spatial velocity, sum of absolute slopes, and absolute slope in lead Y falls within the mean values plus or minus variance is determined for 24-sec time windows. The wave recognition point is considered to occur within the time window with the highest score. In the third method, reference points before and after the P-wave are estimated and the amplitudes relating to the line connecting these points are summed. A threshold method applied to the integral curve determined the points of P onset and offset, which are represented as break points. In terms of absolute deviations in wave recongition, the proposed algorithms produce results comparable to those obtained by visual evaluation. C.K.D.

**A76-35918 Computer analysis of normal and abnormal P loops of the Frank vectorcardiogram.** M. Yokota, Y. Watanabe, I. Sotobata, and S. Yasui (Nagoya University, Nagoya, Japan). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 227-232.

Frank-vectorcardiogram P loops with satisfactory S/N ratios were obtained for normal subjects and subjects with diagnosed mitral valvular disease, atrial septal defect of the secundum type, mitral stenosis, mitral steno-insufficiency, or mitral stenosis with aortic insufficiency by means of a computer averaging technique (Yokota et al, 1972). From the results, increased left atrial volume appears to be a more effective indicator of increased spatial maximal P vector magnitude than elevated pulmonary wedge pressure in mitral stenosis. In comparison with normal subjects, subjects suffering from atrial septal defects showed an increase in the magnitude of the three planar and spatial maximal P vectors and in the mean polar P vectors. A highly significant correlation between the magnitude of the mean polar P vector and the size of the defect was noted. In mitral valvular disease, the P loop showed a prolonged time interval from onset to occurrence of the maximal vector, and a marked increase in spatial and planar magnitudes. C.K.D.

**A76-35919 Quantitative classification of T-wave abnormalities in the VCG.** J. L. Talmon and G. van Herpen (Nederlandse Centrale Organisatie TNO, Medisch-Fysisch Instituut, Utrecht, Netherlands). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 233-236.

**A76-35920 Comparison of the performance of a computer compared to the effectivity of a physicians analysis of infarction ECGs.** W. Enenkel and R. Spiel (Krankenhaus der Stadt Wien-Lainz, Vienna, Austria). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 240-245. 11 refs.

Diagnoses of myocardial infarct obtained from ECGs using the Riedl-ISPHS program (1970) were compared with those made by a cardiologist on the basis of the same materials. The presence of myocardial infarct in the subjects was determined independently by fullfillment of one or more of World Health Organization criteria: autopsy positive; ECG typical; pain typical, raised serum enzymes; pain atypical, ECG uncertain, raised serum enzymes. The computer program gave 50% false interpretations, while the cardiologist incorrectly interpreted the ECGs in 24.5% of the cases. Both the computer and the physician reached more false diagnoses in anterior than in posterior infarcts. C.K.D.

**A76-35921 Computer analysis of the Frank electrocardiogram and vectorcardiogram in patients with segmental areas of akinesia or dyskinesia on left ventricular angiogram.** D. McCaughan, G. Turini, and H. V. Pipberger (U.S. Veterans Administration Hospital; George Washington University, Washington, D.C.; U.S. Veterans Administration Hospital, West Roxbury; Harvard University, Boston, Mass.). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 246-250. 5 refs. Grant No. NIH-HL-15047-01.

**A76-35922 A new rhythm classification program applied to routine electro- and vector-cardiograms.** M. Sajet, Y. Delcambre, J. Wurzburger, and M. D. Cimhub (Brussels, Free University, Brussels, Belgium). In: Electrocardiology; Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 256-259.

A rhythm classification analysis procedure has been developed for application to data sets consisting of four 4.8-sec 12-lead electrocardiogram (ECG) records and one 10.4 sec vectorcardiogram (VCG) record. In the first module of the analysis, spatial velocity is used to determine the onset and end of the QRS complex and the

end of the T wave for individual beats. To detect P waves, the raw data are filtered between the end of the T wave of the previous beat and the onset of the QRS complex, and linear interpolation is used to eliminate baseline drift. Noise is measured during the 30 sec preceding the onset of the QRS complex and subtracted, and the resulting signals from the three leads of a group are rectified and summed. The second module of the analysis combines all parameters calculated for each beat separately; the 30-sec record of the VCG and ECG is considered as a single set of data. The basic rhythm is correctly identified by this method in 90% of the tracings; most errors are due to fibrillo-flutter. Detection of extrasystoles gives 10% false negatives. C.K.D.

A76-35923 **Classification of myocardial infarction according to the vector maps of the 'Electric Heart Portrait' and the pathological signs in ECG.** F. A. N. Kienle and K. Maldener (Herzklinik, Karlsruhe, West Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 281-309. 54 refs.

A76-35924 **P-wave abnormalities in right and left ventricular overload - Electrocardiographic and hemodynamic correlations.** N. Tuna, C. R. Brohet, and C.-E. Liedtke (Minnesota, University, Minneapolis, Minn.). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First Intefnational Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 354-359. 18 refs. Grants No. NIH-HL-08517-09; No. NIH-RR-267.

A76-35925 **Sinus arrhythmia and heart rate in hypertonic disease.** K. Eckoldt, K.-H. Bodmann, H. Cammann, B. Pfeifer, and E. Schubert (Berlin, Humboldt-Universität, Berlin, East Germany). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 366-369.

Sinus arrhythmia under normal resting conditions was analyzed for a group of normal subjects and in subjects suffering from hypertension. Correlation coefficients with age, blood pressure, and duration of hypertension were calculated. Sinus arrhythmia was found to decrease with increasing duration of hypertensive illness, decreasing by half every 6.3 years of hypertension. The effect of increased tidal volume was less pronounced in hypertensives than in normal subjects. It is suggested that it may be possible to judge the extent of manifestation of hypertension by measurement of the sinus arrhythmia. C.K.D.

A76-35926 **The relation of left atrial electrical activity and pressure in myocardial infarction.** F. G. Dunn, R. H. Baxter, P. W. Macfarlane, and T. D. V. Lawrie (Glasgow, University, Glasgow, Scotland). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 376-381. 13 refs.

Certain P-wave parameters (P-terminal force, magnitude of the P-wave vector, P-wave amplitude in leads X, Y, and Z, and projection of the P-wave onto the transverse plane) were compared with indirect left atrial pressure in acute myocardial infarction. Although P-wave abnormalities can be found in patients with elevated wedge pressures, no specific correlation could be found between these P-wave parameters and left ventricle dysfunction as measured by wedge pressure in acute myocardial infarction. C.K.D.

A76-35927 **The spatial velocity electrocardiogram of bundle branch block and myocardial infarction and its diagnostic merit in general.** T. Sano, Y. Sakamoto, T. Hiroki, and S. Kokusho (Tokyo Medical and Dental University, Tokyo, Japan). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 394-398. 6 refs.

A76-35928 **Electrophysiological classification of myocardial infarction and principles of analysis of the electrical activity of the heart.** Z. L. Dolabchian (Ministerstvo Zdravookhraneniia Armianskoi SSR, Institut Kardiologii i Serdechnoi Khirurgii, Yerevan, Armenian SSR). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 399-402.

A76-35929 **Computer analysis of vectorcardiograms with special reference to segmental polar vector in myocardial infarction.** S. Yasui, K. Yamauchi, M. Yokota, H. Tanimura, Y. Watanabe, I. Sotobata, M. Yokoi, and N. Okamoto (Nagoya University, Nagoya; Center for Health Care, Aichi, Japan). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 424-434. 7 refs.

A76-35930 **Continuous 24-hour electrocardiogram in the diagnosis and the prognosis of the so-called 'left hemiblock'.** V. M. Lopes, M. Carrageta, and F. de Pádua (Clínica Universitária de Terapêutica Médica, Lisbon, Portugal). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 469-478. 15 refs.

A76-35931 **Studies on left anterior hemiblock - Correlations between systolic time intervals and orthogonal VCG.** C. Ramalhão, F. Rocha-Gonçalves, A. Ribeiro, M. J. Maciel, C. Abreu e Lima, and M. Cerqueira-Gomes (Porto, Universidade, Oporto, Portugal). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 483-489. 18 refs. Research supported by the Instituto de Alta Cultura.

A76-35932 **The diagnostic value of exercise electrocardiograms.** C. A. Distelbrink, C. A. Ascoop, and P. A. De Lang (Nederlandse Centrale Organisatie TNO, Medisch-Fysisch Instituut, Utrecht, Netherlands). In: Electrocardiology: Physiological, pathophysiological and diagnostical research; Proceedings of the First International Congress, Wiesbaden, West Germany, October 14-17, 1974. Basel, S. Karger AG, 1976, p. 529-533.

The value of different leads and criteria in diagnosing obstructive coronary sclerosis was assessed by comparing the results of exercise ECGs with findings from coronary arteriography in a group of 87 patients. In addition to Frank X, Y, and Z leads, the CC5 and CM5 special bipolar exercise leads (Distelbrink et al., 1972) were used. Digital filtering, coherent averaging and waveform recognition of the digitized data were performed automatically. Results indicate that analysis of readings from a system with precordial leads such as CC5 and CM5 is as effective in diagnosing obstructive coronary sclerosis as using VCG system data. C.K.D.

A76-36155 **A study of comparative blood pressure measures in predicting risk of coronary heart disease.** R. H. Rosenman, R. I. Sholtz (Mount Zion Hospital and Medical Center, San Francisco, Calif.), and R. J. Brand (Mount Zion Hospital and Medical Center, San Francisco; California, University, Berkeley, Calif.). *Circulation*, vol. 54, July 1976, p. 51-58. 45 refs. Grant No. NIH-HL-03429.

The Western Collaborative Group Study is a prospective study of 3,154 employed men, aged 39-59 years. Coronary heart disease (CHD) occurred in 357 subjects during 8.5 years of follow-up. The

multiple logistic risk model was used to assess the comparative strength of systolic, diastolic, mean arterial and pulse pressure for the prediction of CHD in two age decades after adjustment for age, serum cholesterol, cigarette smoking, behavior pattern and weight. The risk of CHD was more strongly associated with the systolic than the diastolic pressure. The general practice of assessing the importance of blood pressure based only on the diastolic component should be reassessed. (Author)

A76-36156 **Determinants of ventricular septal motion - Influence of relative right and left ventricular size.** A. S. Pearlman, C. E. Clark, W. L. Henry, J. Morganroth, S. B. Itscoitz, and S. E. Epstein (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.). *Circulation*, vol. 54, July 1976, p. 83-91. 31 refs.

To test the hypothesis that the ventricular septum moves during systole toward the center of ventricular mass (including both ventricular muscle and intraventricular blood), echocardiograms were reviewed retrospectively from patients with atrial septal defect and subsequently from patients with other causes of right or left ventricular volume overload, right or left ventricular pressure overload, and from normal subjects. It is shown that both the direction and magnitude of ventricular septal motion during systole are determined by the intracardiac position of the septum at end-diastole, suggesting that the midpoint of the septum moves toward the center of ventricular mass. The magnitude of ventricular volume or pressure overload affects the nature of septal motion only insofar as it causes ventricular dilatation. The echocardiographic demonstration of paradoxic anterior systolic septal motion simply reflects relative right ventricular dilatation of any cause. S.D.

A76-36171 **Aspirin therapy in angina pectoris - Effects on platelet aggregation, exercise tolerance, and electrocardiographic manifestations of ischemia.** W. H. Frishman, J. Christodoulou, B. Weksler, C. Smithen, T. Killip, and S. Scheidt (New York Hospital-Cornell Medical Center, New York, N.Y.). *American Heart Journal*, vol. 92, July 1976, p. 3-10. 37 refs. Research supported by the New York Heart Association; Grant No. PHS-PH-43-67-1439.

A76-36172 **A comparative analysis of four protocols for maximal treadmill stress testing.** M. L. Pollock, R. L. Bohannon, K. H. Cooper, J. J. Ayres, A. Ward, S. R. White (Institute for Aerobics Research, Dallas, Tex.), and A. C. Linnerud (Institute for Aerobics Research, Dallas, Tex.; North Carolina State University, Raleigh, N.C.). *American Heart Journal*, vol. 92, July 1976, p. 39-46. 26 refs.

Results are presented for a comparative study of four popularly used maximal treadmill stress tests (MTSTs) performed on 51 volunteer healthy men, aged 35-55 years, dichotomized into trained and untrained groups. The four MTSTs studied were the Balke (1959), Bruce (1969), Ellestad (1969), and a modified Astrand (1970) with a continuous multistage running protocol. Major objectives were to evaluate the ability of the four MTSTs to assess maximal cardiopulmonary responses, to compare submaximal responses, to compare the responses to the four MTSTs for trained and untrained subjects, to plot a nomogram for making comparison between these tests, and to compare the results with findings from other investigations. No significant differences are found between tests at maximum for oxygen volume per unit time, heart rate, and blood pressure, except for oxygen volume per unit time for the Balke as compared to the running protocol. The nomogram comparing treadmill time and maximal oxygen intake is considered valid up to oxygen volume per unit time requirement of 50 ml/kg-min. S.D.

A76-36216 # **Cyanogenic compounds in nature and their possible significance concerning the origin of life.** R. Eyjolfsson. *British Interplanetary Society, Journal*, vol. 29, July-Aug. 1976, p. 482-488. 23 refs.

Some implications of the natural occurrence of cyanogenic compounds on earth are discussed. It is noted that the synthesis of nucleic-acid bases and amino acids appears to be wholly dependent on the presence of hydrocyanic acid, that hydrogen cyanide is not a deadly poison in today's biosphere within certain limits, and that contemporary organisms produce and metabolize hydrocyanic acid in relatively large amounts. Characteristic features of natural cyanogenic compounds are described, their distribution in terrestrial life forms is reviewed, and the biosynthesis and metabolism of cyanogenic glycosides are examined. It is concluded that the cyanogens, cyanide metabolism, and cyanide detoxification are chemical footprints from processes which occurred on earth eons ago. F.G.M.

A76-36232 * **Microfossils in Conophyton from the Soviet Union and their bearing on Precambrian biostratigraphy.** J. W. Schopf (California, University, Los Angeles, Calif.) and Iu. K. Sovetov (Akademiia Nauk SSSR, Institut Geologii i Geofiziki, Novosibirsk, USSR). *Science*, vol. 193, July 9, 1976, p. 143-146. 20 refs. NSF Grant No. GB-37257; Grant No. NGR-05-007-407.

Silicified specimens of the Vendian (late Precambrian) 'index fossil' Conophyton gaubitza from South Kazakstan contain a diverse assemblage of well-preserved cyanophytic and apparently eukaryotic algae, the first stromatolitic microbiota to be reported from the Soviet Union. Unlike the stromatolites in which they occur, the microorganisms that apparently built this form of Conophyton did not become extinct at the end of the Precambrian. (Author)

A76-36375 # **On the perception of phase differences in acoustic signals.** T. J. F. Buunen. Delft, Technische Hogeschool, Doctor in de technische Wetenschappen Dissertation, 1976. 107 p. 62 refs.

The present thesis describes some experimental investigations concerning the audibility of phase differences in acoustic signals. It is shown that phase differences are audible only if the separation between the frequency components of the signal is sufficiently small. Two possible mechanisms for nonaural phase effects are examined: time-structure detection by the auditory system and interactions of combination tones with acoustic frequency components within the ear. Experimental evidence is presented, showing that phase effects in three-component or broadband signals cannot be used as a straightforward indication of the ear's ability to detect time-structure aspects of the signal. Envelope detection of signals with very small frequency separations is demonstrated, and the ability of the ear to follow amplitude variations of a signal is quantified. It is concluded that the audibility of phase differences can be satisfactorily explained in terms of envelope detection and the interaction of combination tones with acoustic frequency components. F.G.M.

A76-36631 **Temporal summation and reaction time to double-light pulses at suprathreshold levels.** T. Ueno (Osaka City University, Osaka, Japan). *Perception and Psychophysics*, vol. 19, no. 5, May 1976, p. 399-404. 20 refs.

Temporal summation of the visual system was studied at suprathreshold levels by measuring reaction time (RT) to the double pulses that were equal in luminance (L) and duration. The RTs were determined as functions of L and the stimulus onset asynchrony (SOA) between the onsets of the two pulses. The relation between RT and L obtained for a given SOA was found to be a power function with the exponent 1/3. The function relating L to SOA was then derived for each of three criterion RTs. The L-SOA relationship indicated partial summation at SOAs shorter than about 20 msec. Inhibition was observed at SOAs longer than about 80 msec. These findings were consistent with the predictions from a temporal integration model. (Author)

A76-36632 **Similarity - Its definition and effect on the visual analysis of complex displays.** M. H. Singer and J. S. Lappin (Vanderbilt University, Nashville, Tenn.). *Perception and Psychophysics*, vol. 19, no. 5, May 1976, p. 405-411. 17 refs. Research supported by the Spencer Foundation and Vanderbilt University Research Council; Grant No. PHS-MH-21105.

Two experiments were conducted to test the adequacy of the definition of visual similarity in terms of shared or discordant sets of

points. The first experiment compared the detectability of three transformations: deletion of an end-of-a-line segment, a break in continuity, and a mirror-image reversal. The second experiment tested whether the better detectability of reversals was due to a greater number of discordant points or to changes in the orientation of diagonal lines. Experimental results strain the definition of similarity given by contemporary feature-models of visual form perception. It is shown that the detectability of a difference between two forms depends upon the context in which the difference occurs, and that the detectability of a reversal transformation involves a comparison of line orientations throughout the entire display. It is suggested that the similarity of forms may depend upon the transformations by which they are related rather than their common features. S.D.

A76-36633 **Two kinds of adaptation in the constancy of visual direction.** H. Wallach (Swarthmore College, Swarthmore, Pa.) and T. Canal (Cornell University, Ithaca, N.Y.). *Perception and Psychophysics*, vol. 19, no. 5, May 1976, p. 445-449. 6 refs. Grant No. NIH-11089.

Adaptation in the constancy of visual direction had previously been obtained by causing a large or a small visible area representing the environment to be objectively displaced in dependence on head movements. No stationary objects were permitted to be visible. Now experiments are reported in which displacements of a large patterned field, with the subject fixating a stationary mark in its center, led to adaptation. In these experiments, objective displacements of the environment were given by image displacements on the retina. Adaptation also resulted when the large field was stationary and only the fixation mark was displaced. Here the objective displacement was given by the rate of pursuit eye movements. (Author)

A76-36634 * **Effects of visual imagery on the accommodation response.** F. V. Malmstrom (U.S. Air Force Academy, Colorado Springs, Colo.) and R. J. Randle (NASA, Ames Research Center, Moffett Field, Calif.). *Perception and Psychophysics*, vol. 19, no. 5, May 1976, p. 450-453. 14 refs. USAF-supported research.

Twenty-seven naive male subjects were tested to determine whether they could effect appropriate accommodation changes in an empty field by 'thinking near' and 'thinking far'. Evidence indicated that naive subjects could effect significant and appropriate accommodation changes, but only about a steady-state value of 1.0 diopter. Additionally, the data support the hypothesis that the resting state of accommodation is not at the visual far point, but, rather, at about 1.0 diopter. (Author)

A76-36639 # **Changes in hemodynamic indices under conditions of hemodilution induced by transfusion of blood substitute geosen after acute hemorrhage (Zmina pokaznikiv gemodinamiki v umovakh gemodiliutsii, viklikanoi perelivanniam krovozaminnika geosenu pislia gostroi krovovrati).** A. I. Vorobei (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, Mar.-Apr. 1976, p. 176-181. 20 refs. In Ukrainian.

A76-36640 # **Role of thyroid and adrenal medulla hormones in thermoregulation reactions (Rol' gormoniv shchitovidnoi zalozi ta mozkovogo sharu nadnirkovikh zaloz u reaktsiiakh termoreguliatsii).** V. I. Sobolev and S. O. Pevnii (Donets'kii Derzhavnii Universitet, Donetsk, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, Mar.-Apr. 1976, p. 188-195. 20 refs. In Ukrainian.

The effect of catecholamines and reserpin on thermoregulation was tested in control, hyperthyroid, and hypothyroid rats. The hyperthyroid animals exhibited the highest cold resistance. Cold exposure was accompanied by decreases in the respiratory coefficient of hyperthyroid and control rats, which points to changes in oxidation substrates during cooling. Triiodothyronin even in small doses strengthens the calorigenic action of adrenalin and noradrenalin. It is suggested that this effect may take place in animals acclimated to cold. P.T.H.

A76-36641 # **Functional state of adrenal cortex of rats after cooling in the hermetically sealed chamber and during adaptation to cooling (Funktsional'nii stan kori nadnirkovikh zaloz shchuriv pislia okholodzhennia v germokameri ta v protsesi adaptatsii do n'ogo).** V. I. Bertash and N. V. Korostovtseva (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR). *Fiziologichnii Zhurnal*, vol. 22, Mar.-Apr. 1976, p. 202-206. 13 refs. In Ukrainian.

A76-36642 # **Individual features of reactions to blood letting in rats of high and low resistance to acute hypoxia (Individual'ni osoblivosti reaktsii na krovopuskannia u visokostiikikh ta niz'kostiikikh do gostroi gipoksii shchuriv).** V. Ia. Berezovs'kii and V. I. Nosar (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 297-302. 19 refs. In Ukrainian.

By repeated tests under the vacuum bell, rats of high and low resistance to hypoxia were diseriminated. It was shown that in the two groups, blood losses in the amount of 1% body weight lead to dissimilar changes in the protein content and protein fractions of blood serum. In most of the high-resistance animals the blood letting caused an increase in the total protein content and protein fractions in the blood serum, or an insignificant decrease with normalization toward the fourth to seventh day. In most of the low-resistance animals the blood letting caused a decrease in the total protein content in the blood serum; in particular, a sharp drop in albumin content was observed. These indices did not recover within twelve days of the blood letting. The uniformity of reactions on the part of the respiratory center and systems controlling the constancy of blood protein content indicates that the stability of a given organism to oxygen deficiency is determined by its genetically caused biochemical individuality. P.T.H.

A76-36643 # **Functional changes of hypothalamic neurosecretory centers after hyperbaric oxygenation (Funktsional'ni zmini gipotalamichnikh neirosekretornikh tsentriv pislia giperbarichnoi oksigenatsii).** I. I. Gerzanich (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 303-309. 17 refs. In Ukrainian.

Dynamics of functional changes in the supraoptical (SO) and paraventricular (PV) nuclei was studied in albino male rats of the Vistar line after hyperbaric oxygenation. Hyperbaric oxygenation is established to intensify in both nuclei the processes of synthesis of neurosecretory substance, its removal and outflow. The changes observed during the periods after the experiment show a tendency to restoration of the functional activity of both neurosecretory centers. The state of indices of the SO and PV nuclei functional activity is different by the end of the day. The function of the PV nuclei is restored completely and a subsequent intensification of neurosecretion synthesis occurs in SO. (Author)

A76-36644 # **Characteristics of nitrogen metabolism in the organism of animals of high and low resistance to hypoxia (Osoblivosti azotnogo obminu v organizmi visokostiikikh ta niz'kostiikikh do gipoksii tvarin).** O. A. Boiko and S. O. Rileeva (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 310-316. 26 refs. In Ukrainian.

When studying peculiarities of nitrogen metabolism in rats of high and low resistance to hypoxia (HRH and LRH, respectively) it was established that the presence of animals in the altitude chamber for 2 h at the 'height' of 9,000 m activates NAD-dependent glutamate dehydrogenase (GHD) of the brain and liver and increases the level of urea in the blood. More active NAD-dependent GDH of brain and a lower level of urea in blood are peculiar to the HRH individuals. Changes in the studied indices with hypoxia are in the same direction for both groups, but the degree of these changes is different. (Author)

A76-36645 # **Structure of hemodynamic shifts during hypoxic hypoxia in dogs with experimental arterial hypertension**

**(Pro strukturu gemodinamichnikh zrushen' pri gipoksichnii gipoksii u sobak z eksperimental'noiu arterial'noiu gipertonieiu).** T. Mansurov (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR; Tashkentskii Oblastnoi Pedagogicheskii Institut, Tashkent, Uzbek SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 317-327. 41 refs. In Ukrainian.

Hypoxic hypoxia in control animals and dogs with arterial hypertension (AH) leads to hemodynamic shifts similar in direction but different in degree. The increase in cardiac output and heart rate in the hypertense dogs was considerably greater than in the control animals. However, the pressor reaction in dogs with AH was much less than in the control dogs under the same conditions, which is possibly due to the weakening of the effect of the hypertension-inducing agent. Some increase in cardiac output was observed in dogs with 4-5-week period of development of renal hypertension, while in dogs with 3-4-month period, hypoxic hypoxia is accompanied by the same degree of cardiac output increase as in healthy dogs. Apparently the adaptation of the circulatory system to changing environmental conditions takes place slowly in dogs with experimental arterial hypertension. P.T.H.

A76-36646 # **Some indices of the respiratory function of the blood in glycolytic processes in tissues of heterothermal and homoiothermal rodents under acute hypoxic hypoxia (Deiaki pokazniki dikhal'noi funktsii krovi i glikolitichni protsesi v tkaninakh geterotermnikh i gomoiotermnikh grizuniv pri gostrii gipoksichnii gipoksii).** N. M. Shumits'ka (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 328-334. 41 refs. In Ukrainian.

A76-36647 # **Effect of adrenalin and noradrenalin on heart resistance to hypoxia (Diia adrenalinu i noradrenalinu na rezistentnist' sertsia do gipoksii).** O. O. Markova and V. V. Koptiukh (Ternopil's'kii Medichnii Institut, Ternopol, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 343-348. 27 refs. In Ukrainian.

The mechanism for the effect of catecholamines on the heart's resistance to hypoxia was studied in experiments on 370 albino mice and 35 albino rats. Small doses of catecholamines and antiadrenergic agents (reserpin, ornid, inderal) were found to increase heart resistance to hypoxia. It is concluded that this effect depends on the ability to lower the oxygen consumption in the organism and on the ability of the antiadrenergic agents to prevent the damaging effect of excessive amounts of adrenergic agents on miocardium. (Author)

A76-36648 # **Shunting of mixed venous blood into the arterial bed at early stages of ontogenesis under conditions of acute hypoxic hypoxia (Shuntuvannia zmishanoi venoznoi krovi v arterial'ne ruslo na rannikh etapakh ontogenezu za umov gostroi gipoksichnoi gipoksii).** M. M. Seredenko, M. P. Adamenko, T. V. Serebrovs'ka, T. M. Kovalenko, and V. P. Pozharov (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 349-356. 42 refs. In Ukrainian.

A76-36649 # **Functional state of the pancreas under the joint influence of hypoxy, hypercapnia, and cooling (Funktsional'nii stan pidshlunkovoi zalozi pri poednanomu vplivi gipoksii, giperkapnii i okholodzhennia).** V. I. Bertash, Z. P. Kasumova, V. I. Baev, and E. I. Bulakh (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 357-361. 13 refs. In Ukrainian.

A76-36650 # **Role of neurohormonal system disturbances in the change of immunological reactivity of an organism in the presence of hypothalamic syndromes and means for its normalization (Do pitannia pro rol' porushennia neirogormonal'nikh sistem u zmini imunologichnoi reaktivnosti pri gipotalamichnikh sindromakh ta shliakhi ii normalizatsii).** O. F. Makarchenko, G. D. Dinaburg, A. D. Lauta, A. P. Zaichenko, and G. Ia. Zavads'ka (Akademiia Nauk Ukrains'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 362-372. 33 refs. In Ukrainian.

A76-36651 # **Cardio-respiratory correlates of an experimental model of anticipation stress (Sertsevo-dikhal'ni koreliati eksperimental'noi modeli 'stres chekannia').** V. G. Samokhvalov (Kharkivs'kii Medichnii Institut, Kharkov, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 373-379. 13 refs. In Ukrainian.

The cardio-respiratory components of emotional stress were studied in rats under conditions of continuous many-hour neurotization. The use of stimulants according to a strict temporal scheme evoked profound changes in the cardiac and respiratory system functions, with peculiar courses characteristic for the different type of animals (the 'inhibited' type, 'steady' type, 'excited' type). The phase changes in the cardiovascular and respiratory system responses were observed: the stage of anxiety, stage of adaptation, stage of exhaustion, as well as the individual peculiarities in the course of reactions. Three types of cardiovascular and respiratory system responses under conditions of anticipation stress were established: increased rate, decreased rate, relative stability. The sympathetic tonus prevalence was noted. (Author)

A76-36652 # **Effect of physical loads on morphological and biochemical blood indices (Vpliv fizichnikh navantazhen' na morfologichni ta biokhimichni pokazniki krovi).** Iu. T. Chernikov (Voroshilovgrads'kii Pedagogichnii Institut, Voroshilovgrad, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 384-389. 13 refs. In Ukrainian.

The effect of running on the content of regular blood elements (total leucocyte content, leucocytic formula, content of erythrocytes and hemoglobin) and on the activity of several redox enzymes (catalase, carbonic anhydrase, peroxidase) was studied in males of four age groups: 10-12, 13-15, 16-18, and 19-26 years. Less pronounced shifts in the leucocyte content were observed in persons of the first two groups than in those of the last two. Erythrocyte and hemoglobin content changes were slight. No definite changes in catalase activity are observed after the load. Carbonic anhydrase activity under these conditions increases in persons of all age groups. The activity of peroxidase changes slightly in the first and second groups and increases in persons of the third and fourth groups. P.T.H.

A76-36653 # **Effect of oxygen-vitamin complex on indices of blood formation in an irradiated organism (Vpliv kisnevo-vitaminnogo kompleksu na pokazniki krovotvorennia v opromenomu organizmi).** N. L. Shvans'ka, L. T. Khrulenko, L. P. Kindzel's'kii, and L. A. Baran (Kiivs'kii Rentgeno-Radiologichnii i Onkologichnii Institut, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 22, May-June 1976, p. 395-399. 7 refs. In Ukrainian.

Indices of the peripheral blood and bone marrow and changes in body weight and spleen weight were studied in healthy rats and rats with a carcinoma irradiated with a dose of 600 r. Severe hypoplasia of the bone marrow was detected, under which the recovery processes were weakly pronounced and did not lead to restoration of hemopoeisis. The degree of radiation damage in the tumoral animals was more significant than in healthy ones irradiated with an equal dose, and led to their death. Use of an oxygen-vitamin complex effected an enhancement of recovery processes in the bone marrow of lymphoid tissue, which manifested itself as an earlier and more intensive restoral of the cell content of the bone marrow, indices of the peripheral blood, and spleen weight. The effect was most pronounced in animals with intertwined tumors. P.T.H.

A76-36654 # **Method for automatic recording of heart rhythm with the use of standard electronic equipment (Metodika**

**avtomatichnoi reestratsii ritmu sertsia iz zastosuvanniam seriinoi radioelektronnoi aparaturi).** O. O. Vernigor, A. M. Podgurs'kii, D. G. Rotenberg, Z. I. Kaloev, and K. G. Takhchi (Kiivs'kii Okruzhnii Viis'kovii Gospital', Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal,* vol. 22, May-June 1976, p. 420, 421. 7 refs. In Ukrainian.

A method for completely automatic analysis of heart rhythm is described, whose chief merit lies in the use of common, commercially produced instruments for recording the dynamic series of the ECG R-R intervals. It is recommended that the equipment be used for studying the slow heart rhythms when in the analysis use is made of a compression intervalogram with compression factor of 10, 100, or more that can be recorded for a protracted period of time (1-10 hours). P.T.H.

A76-36751 **The search for life on Mars.** R. Lewin. *New Scientist,* vol. 71, July 1, 1976, p. 26, 27.

The Viking-1 and -2 will carry out duplicate sets of experiments designed to detect life or vestiges of life on Mars. A pyrolytic release test will be performed to detect uptake and metabolism of carbon dioxide by microbes. A soil sample will be exposed to radioactively labeled carbon dioxide and carbon monoxide under an argon lamp for five days, after which the gases are to be driven off and the sample heated to release any carbon incorporated into organic compounds by microorganisms. A gas exchange experiment will detect any changes in the composition of the gaseous medium surrounding an incubated soil specimen, which is either moistened with water or bathed in an aqueous mixture of nutrients of the type typically used for the growth of terrestrial microbes. The third experiment will determine whether simple, radioactively labeled organic nutrients are metabolized by microbes during an incubation period. The Viking biology experiments have severe limitations due to the sample size and the lack of mobility of the lander. C.K.D.

A76-36809 **An investigation of spatial frequency characteristics of the complex receptive fields in the visual cortex of the cat.** V. D. Glezer, A. M. Kuperman, V. A. Ivanov, and T. A. Shcherbach (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Vision Research,* vol. 16, no. 8, 1976, p. 789-797. 24 refs.

A76-36810 **Adjacency and attention as determiners of perceived motion.** W. C. Gogel and J. D. Tietz (California, University, Santa Barbara, Calif.). *Vision Research,* vol. 16, no. 8, 1976, p. 839-845. 19 refs. Research supported by the University of California; Grant No. PHS-MH-15651.

Motion induction was investigated as a function of depth adjacency and attention. Moving induction objects producing opposing induction effects in a test object were presented simultaneously at different distances in the visual field with the apparent distance of the test object varied relative to the induction objects. In agreement with the adjacency principle, it was found that separating the test and induction object in apparent depth decreased the induction effect. Instructions to attend to one and to ignore the other induction object while looking at the test object clearly modified the induction effect and accounted for about half of the total effect produced by depth adjacency. The results are discussed in terms of the measurement of attention and the ability to perceptually organize the visual world. (Author)

A76-36811 **Linked changes in spatial integration, size discrimination, and increment threshold with change in background diameter.** L. Matin and A. Kornheiser (Columbia University, New York, N.Y.). *Vision Research,* vol. 16, no. 8, 1976, p. 847-860. 50 refs. NSF Grant No. BMS-73-01463; Grant No. PHS-2-RO1-EY-00375.

The degree to which increment threshold and spatial integration are governed by a common mechanism was investigated. The effect of increasing the background diameter on the relation between the area of a test stimulus and the energy required for detection of a luminance increment was studied in two experiments; a third examined the influence of changes in the background diameter in size discrimination for barely detectable flashes. The well known reduction of increment threshold with an increase of background diameter was shown to be markedly attenuated with large test flashes, reflecting a decrease of the distance over which spatial integration extends. These effects are accompanied by an improvement in size discrimination between equally detectable flashes. A theory is developed on the basis of these results in which 'parcelling' of the central region of the background is assumed to be produced by the outer annular region of the large background, giving a smaller effective background for each flash. Parcellation may be interpreted within the context of either a single- or multichannel mechanism. C.K.D.

A76-36812 **Short-term memory for symmetry.** J. H. Hogben, J. Ross (Western Australia, University, Nedlands, Australia), and B. Julesz (Bell Telephone Laboratories, Inc., Murray Hill, N.J.). *Vision Research,* vol. 16, no. 8, 1976, p. 861-866. Australian Research Grants Committee Grant No. A68/6810.

Symmetric cascades of dots were generated in a continuous random sequence such that each dot had a partner reflected about a vertical or horizontal axis, respectively. Between each point and its partner a temporal delay was introduced. While the brightness of the dots appeared constant within 120-140 msec, symmetry perception ceased at delays in the range of 50-90 msec, depending on observers, type of symmetry and plotting rate. These findings in conjuction with three control studies suggest that memory span for position information is limited to 50-90 msec while memory for brightness information lasts for 120-140 msec. Perturbation experiments (with no delay) in which a certain proportion of dots had no symmetrical partner were compared with the delay experiments for equal performance, and equivalence curves between delay and perturbation rate were obtained. While performance depended on the type of symmetry and plotting rate, the shape of equivalence curves remained unchanged. (Author)

A76-36874 # **In an unforeseen circumstance (V neshtatnoi situatsii).** N. Fefelov. *Aviatsiia i Kosmonavtika,* May 1976, p. 40, 41. In Russian.

The ability of a cosmonaut to deal effectively with an unforeseen circumstance in the mission regime (such as a mechanical failure) depends on the type of ground training that he has received and on his state of mental and physical health. Prospective cosmonauts should be given experience in training in carrying out flight-related tasks during prolonged periods of activity without sleep. Experimental results have shown that the most hazardous period in a two-day continuous work stretch is the end of the first day through the beginning of the second. Measures should be taken at this point to counteract the adverse effects of prolonged sleeplessness. In the case of the abortive Apollo-13 manned lunar mission, artificial stimulants were prescribed. Experiments have indicated that the use of hypnosis to induce an illusion of being well rested can improve performance in flight tasks. C.K.D.

A76-36879 # **EKG-studies concerning an early recognition of the heart-circulation diseases and the condition of the flying personnel (EKG-Untersuchungen zur Früherkennung von Herz-Kreislauf-Krankheiten und des Konditionszustandes beim fliegenden Personal).** J. Wirth and W. E. Hempel (Ministerium für Verkehrswesen, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 12, no. 2, 1976, p. 95-99. 13 refs. In German.

The possibility of an occurrence of aircraft accidents which are caused by the effects of a heart-circulation disorder in a pilot makes it very important to examine the condition of the respective physical systems of a pilot. An investigation was conducted with the objective to determine the suitability of a one-stage stress test for this examination. The investigation included the conduction of one-stage and multistage stress tests with 35 male pilots. The investigation

shows that the one-stage stress test can be used to enhance significantly the information obtained in routine studies. G.R.

A76-36880 # **The behavior of the retina vessels under hypoxy conditions (Das Verhalten der Netzhautgefässe unter Hypoxiebedingungen).** K. U. Obdekamp and I. Lehwess-Litzmann (Ministerium für Verkehrswesen, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt*, vol. 12, no. 2, 1976, p. 100-103. 11 refs. In German.

An investigation was conducted concerning the effect which a decrease in oxygen concentration from 21% at the ground to 11% at an altitude of 5000 m will produce on the retinal vessels. Photographs of the retina of 60 persons were obtained, taking into account the condition of the retina at the ground, after a subjection to the conditions at an altitude of 5000 m for a time of 5 minutes, and again after a subjection to hypoxy conditions for 25 minutes. Measurements of vessel dimensions were conducted with the aid of the photographs, giving attention to seven parameters. The effect of the hypoxy conditions on the parameters is discussed. It is pointed out that the age of the person had no effect on the results obtained for the seven retina parameters. G.R.

A76-36889 # **Changes in the synovial membrane and in the articular cartilage after intense movement.** V. Vasilev, N. Vidinov, and A. Mishankov (Vissh Meditsinski Institut, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 29, no. 4, 1976, p. 591-594. 10 refs.

The morphology of the articular elements under conditions of intense movement was studied experimentally using 35 Wistar rats which had one of their rear legs amputated at the upper third of the leg bone. Experiments were carried out by means of a treadmill with the rats moving on the belt at a speed of 750 m/h for different periods of time (1 to 6 h). Optical and electron microscopy were performed on the knee joint of the intact limb after exercise, with the amputated limb used as a control. Results indicate that the higher functional loading of the joint causes changes in the fine structure of the synovial membrane and of the articular cartilages. Changes in the cytoplasm of the chondrocytes from the middle layer of the cartilage are indicative of higher activity by the cells, while changes in the surface layer have an effect on increased friction which leads to disturbed nutrition and to the removal of some of the cells adjacent to the articular cavity. B.J.

A76-36896 **Hypoxia: Contributions during the years 1932-1972 (Hypoxie: Beiträge aus den Jahren 1932-1972).** F. Büchner. Berlin, Springer-Verlag, 1975. 480 p. In German and English. $27.90.

Investigations related to coronary insufficiency and acute hypoxia of the myocardium are examined, taking into account the role of the myocardium in angina pectoris, the characteristics and possible causes of angina pectoris, the infarction of the heart and disseminated necroses of the myocardium, defects of the myocardium produced by coronary insufficiency, and chronic hypertonia as a factor in the origin of arteriosclerosis. Studies of cardiac hypertrophy and heart insufficiency are also reported, giving attention to the pathological anatomy of heart insufficiency, the quality morphology of heart failures, and the causes and consequences of chronic pulmonal hypertonia. Topics in the areas of hypoxemia, hypoxia, and hypoxidosis are also considered and malformations produced by temporary respiratory disturbances of the embryonic metabolism are discussed. G.R.

A76-36897 **In vitro contractility of the hypertrophied right ventricle of rats with pulmonary hypertension due to confinement in 'hypoxic cages'.** D. Kentera and M. Zdravkovic (Institute for Medical Research, Belgrade, Yugoslavia). *Pflugers Archiv*, vol. 363, no. 3, 1976, p. 235-238. 18 refs. Research supported by the Medical Research Foundation of Serbia.

Four weeks' confinement of rats in individual airtight cages with walls of defined permeability for respiratory gases induced hypoxic pulmonary hypertension and right ventricular hypertrophy. Parameters of isometric contractility of strips of hypertrophied right myocardium did not show significant changes when compared with the parameters of the inotropic state of slices of normal right ventricle. (Author)

A76-36933 * **The Viking mission search for life on Mars.** H. P. Klein (NASA, Ames Research Center, Mountain View, Calif.), J. Lederberg (Stanford University, Stanford, Calif.), A. Rich (MIT, Cambridge, Mass.), N. H. Horowitz (California Institute of Technology, Pasadena, Calif.), V. I. Oyama, and G. V. Levin (Biospherics, Inc., Rockville, Md.). *Nature*, vol. 262, July 1, 1976, p. 24-27. 16 refs.

The scientific payload on the Viking Mars landers is described. Shortly after landing, two facsimile cameras capable of stereoscopic imaging will scan the landing site area in black and white, color, and infrared to reveal gross evidence of past or present living systems. A wide range mass spectrometer will record a complete mass spectrum for soil samples from mass 12 to mass 200 every 10.3 sec. Three experiments based on different assumptions on the nature of life on Mars, if it exists, will be carried out by the bio-lab. A pyrolytic release experiment is designed to measure photosynthetic or dark fixation of carbon dioxide or carbon monoxide into organic compounds. A labelled release experiment will test for metabolic activity during incubation of a surface sample moistened with a solution of radioactively labelled simple organic compounds. A gas exchange experiment will detect changes in the gaseous medium surrounding a soil sample as the result of metabolic activity. The hardware, function, and terrestrial test results of the bio-lab experiments are discussed. C.K.D.

A76-36960 **Step increment versus constant load tests for determination of maximal oxygen uptake.** B. A. Stamford (Louisville, University, Louisville, Ky.). *European Journal of Applied Physiology*, vol. 35, no. 2, 1976, p. 89-93. 13 refs. Research supported by the University of Louisville.

A76-36961 **The adipokinetic effect of hyperthermic stress in man.** D. O. Eddy, K. E. Sparks, and C. L. Turner (Ball State University, Muncie, Ind.). *European Journal of Applied Physiology*, vol. 35, no. 2, 1976, p. 103-110. 21 refs. Research supported by the Ball State University.

Experiments were conducted to study the effect of heat stress and dehydration on alteration of serum free fatty acid (FFA) concentrations in subjects exposed to heat stress in an environment chamber in two situations involving dehydration and rehydration, respectively. Blood samples were analyzed for FFA, glucose, and lactic acid. It is found that hyperthermia accompanied by dehydration results in markedly elevated serum FFA concentrations and that if rehydration is concurrent with heat stress the degree of FAA mobilization is less pronounced. During both conditions a moderate increase in serum glucose is noted. Cardiovascular stress degree indicated by heart rate shows a significant increase related linearly with core temperature. The control mechanisms involved should be identified by further investigations. S.D.

A76-36962 **Oxygen deficit and repayment in submaximal exercise.** D. F. McMiken (Texas, University, Austin, Tex.). *European Journal of Applied Physiology*, vol. 35, no. 2, 1976, p. 127-136. 23 refs.

Treadmill running tests were performed on 30 healthy subjects to study the effect of work duration and intensity on the oxygen deficit-repayment ratio and to re-examine the relative efficiencies of anaerobic and aerobic processes during exercise. Each subject performed a submaximal running test and a test of maximal aerobic power. An active baseline was used from which deficit and repayment values were calculated. The regression analysis presented may be interpreted as if subject had the same body weight and

performed the same workload. Findings regarding the oxygen deficit and repayment relationship confirm earlier studies where oxygen repayment after exercise was observed to exceed calculated oxygen deficit by about 50%. These results imply that anaerobic work is less efficient in terms of energy exchange than aerobic work, since the total oxygen consumption (including oxygen repayment) is increased. The extent of oxygen repayment after exercise is mainly dependent on the physiological intensity of the work and the absolute workload. S.D.

A76-37062 * **Changes in glucose, insulin, and growth hormone levels associated with bedrest.** J. Vernikos-Danellis, C. S. Leach, C. M. Winget, A. L. Goodwin, and P. C. Rambaut (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.; NASA, Johnson Space Center, Houston, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 583-587. 26 refs.

Changes in plasma glucose, insulin, and growth hormone (HGH) resulting from exposure to 56 d of bedrest were determined in five healthy young male subjects. Changes in the daily levels of these factors for each subject were expressed as the mean of six blood samples per 24-h period. The level of HGH dropped after 10 d of bedrest, then showed a 1.5-fold increase at 20 d and subsequently decreased gradually reaching levels of 2.5 mg/ml/24 h, well below pre-bedrest controls of 4.2 mg/ml/24 h, by the 54th d. In spite of a marked increase in the daily plasma insulin levels during the first 30 d of bedrest, glucose levels remained unchanged. Beyond 30 d of bedrest, insulin began decreasing toward pre-bedrest levels and glucose followed with a similar reduction to below the control levels of 75 mg/100 ml/24 h on day 54. The daily mean changes reflect a change in the amplitude of the diurnal variation. The daily peak in plasma insulin shifted progressively to the late evening during the bedrest period. (Author)

A76-37063 **Effect of a 22-day space flight on the lymphoid organs of rats.** G. N. Dumova, A. S. Kaplanskii, and V. V. Portugalov (Ministry of Health of USSR, Institut of Biomedical Problems, Moscow, USSR). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 588-591. 8 refs.

The effect of a 22-d space flight on the lymphoid organs of rats has been investigated. It has been shown that the flight leads to hypoplasia of lymphoid organs, the spleen and thymus weight decreasing very noticeably. Histological, morphometric, and cytological examinations have demonstrated that hypoplasia of the spleen occurs due to a reduction of the number of lymphocytes and erythroid cells and hypoplasia of the thymus and lymph nodes due to a decrease of the lymphocyte number. Changes found in the lymphoid organs of the flight rats are reversible and the structure of lymphoid organs recovers 27 d postflight. Pathogenetic mechanisms of the changes developing in lymphoid organs of rats under the influence of space flight are discussed. The animal data are compared with the results of postflight medical examinations of astronauts. (Author)

A76-37064 **High altitude, indigenous origin, and continuous cardiac monitoring.** S. A. Barton, W. J. Schull (Texas, University, Health Science Center, Houston, Tex.), V. Lenart, F. Murillo (Universidad Boliviana, La Paz, Bolivia), H. Palomino (University of Chile, Santiago de Chile, Chile), and W. Weidman (Mayo Clinic, Rochester, Minn.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 592-596. 18 refs. Grants No. NIH-HL-15614; No. NIH-GM-19513.

Following thorough physical examinations with special attention to the cardiovascular system, pulmonary function, and blood studies, the heart function of 18 individuals acclimated to altitudes in excess of 12,500 ft was monitored by electrocardiogram during a 7-hour period of normal activity. Findings support earlier observations that left ventricular electrical dominance is less common at high altitudes than at sea level. Bradycardia was noted in a high proportion of the subjects. Sinus arrhythmia and/or sinus tachycardia was observed in 3 out of 10 persistently bradycardic individuals. Different aspects of continuous electrocardiogram monitoring under rigorous field conditions are discussed. C.K.D.

A76-37065 **Water exchange in rats exposed to cold, hypoxia, and both combined.** M. J. Fregly, E. L. Nelson, Jr., and P. E. Tyler (Florida, University, Gainesville, Fla.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 600-607. 52 refs. Contract No. N00014-75-C-0199.

A76-37066 **Effects of mevinphos /Phosdrin/ on unit discharge patterns in avian hippocampus.** A. M. Revzin (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 608-611. 14 refs.

Low doses of the acetylcholinesterase inhibitors, mevinphos and physostigmine, reduce hippocampal inhibitory phenomena, measured in terms of the duration of the poststimulus inhibitory pause seen in individual hippocampal neurones in the pigeon. The cholinergic antagonist, atropine, increased hippocampal inhibition. At near threshold doses, mevinphos could, in part, reverse atropine effects. At higher doses, mevinphos synergized with atropine. In the discussion, it is suggested that any organophosphate or carbamate pesticide and its antidote, atropine, may alter 'attention' or 'short-term memory' through effects on hippocampus at doses too low to induce grossly detectable peripheral symptomatology. Extreme caution in the use or handling of these compounds by aerial applicators is urged. Since the effects of atropine and mevinphos can synergize, the use of atropine to permit poisoned applicators to resume activity is questioned. (Author)

A76-37067 **Human and nonhuman operators in manual control systems.** J. A. Bachman, R. J. Jaeger, and T. J. Newsom (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 612-617. 7 refs.

The performance of human and rhesus monkey operators in a single axis compensatory manual control system was compared. Bode plots of the operators' describing functions were remarkably similar, and all results were stable and reproducible throughout all trials. These results indicate that extrapolation from monkey to human performance can be made for behavioral studies involving some tasks under conditions proscribing the use of human subjects. C.K.D.

A76-37068 **Effects of organophosphate pesticides and other drugs on subcortical mechanisms of visual integration.** A. M. Revzin (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 627-629. 10 refs.

Atropine, scopolamine, mevinphos, and eserine selectively block directional sensitivity of visual integrative neurones in the thalamus. Cholinergic drugs that do not penetrate the blood-brain barrier are without effect. The neurones studied are important links in reflex brain systems controlling visual attention and eye movements. The results suggest that any cholinergic drug that can get into the brain will disturb visual functions. Since the changes are qualitative and the system is reflex, the affected individual may be unaware of dysfunction. The resultant dangers to aerial applicator personnel are discussed, particularly with respect to atropine, which is necessary in the therapy of organophosphate and carbamate poisoning but is potentially harmful if self-administered for either prophylaxis or treatment. (Author)

A76-37069 **Interrelation of atmospheric ozone and cholecalciferol /Vitamin D3/ production in man.** J. F. Leach, A. R. Pingstone, K. A. Hall, F. J. Ensell (British Aircraft Corp., Ltd.,

Bristol, England), and J. L. Burton (British Aircraft Corp., Ltd.; Bristol Royal Infirmary, Bristol, England). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 630-633. 21 refs.

Mean atmospheric ozone levels have increased steadily in the last 25 years, and this is likely to have decreased the amount of UVR reaching the earth's surface. Vitamin D3 formation in man depends on the UV irradiation of a precursor in the skin, and so we have used a computer, and the action spectrum for D3 production, to calculate the probable reduction in vitamin D3 formed by the human skin as a result of the increased ozone levels. We estimate that in the period from 1951 to 1972 the total vitamin D accumulation by the body might have thus been reduced by 15%. (Author)

A76-37070 **Effects of low-intensity ultrasound on the central nervous system of primates.** J. H. Hu and W. D. Ulrich (Howard University, Washington, D.C.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 640-643. 16 refs. Navy-supported research.

The brains of anesthetized squirrel monkeys were exposed to 2.25 to 5 MHz ultrasound at low intensities (average power from 3 mW/sq cm to 0.9 W/sq cm). The exposure produced evoked potentials recorded by EEG electrodes chronically implanted in the midline parietal region. Computer analysis of the waveforms showed that ultrasound produced a transient upward shift in both the peak frequency and in its amplitude. Complete adaptation occurred with 3 min of continuous exposure to either continuous wave or pulsed irradiation. (Author)

A76-37071 **Effect of electromagnetic pulse on avoidance behavior and electroencephalogram of a rhesus monkey.** J. L. Mattsson and S. A. Oliva (U.S. Armed Forces Radiobiology Research Institute, Bethesda, Md.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 644-648. 19 refs.

A76-37072 **Hypoxia and auditory thresholds.** P. R. Burkett and W. F. Perrin (U.S. Navy, Naval Regional Medical Center, Oakland, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 649-651. 13 refs. Navy-supported research.

This paper reports the effects of hypoxia on hearing. Pure tone hearing and speech discrimination were tested at ground level and during hypoxic states at simulated altitudes of 4600 m (15,000 ft) and 6100 m (20,000 ft) in a high-altitude chamber. Pure tone hearing was not significantly altered during hypoxia produced by this method. Speech discrimination showed alterations, possibly due to central nervous system hypoxia. It was concluded that hypoxia does not cause significant deterioration of hearing for pure tones. (Author)

A76-37073 **Biochemistry and hematology of decompression sickness - A case report.** M. J. Jacey, E. Heyder, R. A. Williamson, and D. V. Tappan (U.S. Navy, Naval Submarine Medical Research Laboratory, Groton, Conn.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 657-661. 17 refs.

A76-37075 * **Physiologic and anti-G suit performance data from YF-16 flight tests.** K. K. Gillingham (USAF, School of Aerospace Medicine, Brooks AFB, Tex.) and W. R. Winter (NASA, Flight Research Center, Edwards, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 47, June 1976, p. 672, 673.

Biomedical data were collected during high-G portions of 11 YF-16 test flights. Test pilots monitored revealed increased respiratory rate and volume, decreased tidal volume, and increased heart rate at higher G levels, with one pilot exhibiting various cardiac arrhythmias. Anti-G suit inflation and pressurization lags varied inversely with G-onset rate, and suit pressurization slope was near the design value. (Author)

A76-37277 **Simple method for computer-aided analysis of echocardiograms.** S. I. Saffer, J. V. Nixon, and D. J. Mishelevich (Texas, University, Dallas, Tex.). *American Journal of Cardiology*, vol. 38, July 1976, p. 34-37. 10 refs. Grant No. NIH-HL-17669.

Quantitative evaluation of echocardiographic studies has heretofore required time-consuming manipulation of mathematical formulas. A simple method utilizing a sonic digitizing tablet has been developed for computer-aided analysis of M-mode echocardiograms. This device can convert a point located manually with a digitizing pen into X and Y coordinates and with use of the standard telephone network can communicate on a time-shared basis with a DECSYSTEM-10 computer. A program has been written to compute and type the results of standard calculations involving mitral valve motion and left ventricular function. The information can also be stored on disk by the computer for future use. This simple, relatively inexpensive system is valuable because of the ease with which it permits usually laboriously obtained information to be extracted from the standard echocardiogram. (Author)

A76-37278 **A general cardiovascular risk profile - The Framingham Study.** W. B. Kannel, D. McGee, and T. Gordon (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.). *American Journal of Cardiology*, vol. 38, July 1976, p. 46-51. 8 refs.

The paper describes a single risk function for predicting several different cardiovascular diseases and evaluates its efficiency in identifying persons most likely to have these cardiovascular diseases and consequently most in need of preventive care. The 10 percent of persons identified with use of this function as at highest risk accounted for about one fifth of the 8 year incidence of coronary heart disease and about one third of the 8 year incidence of atherothrombotic brain infarction, hypertensive heart disease and intermittent claudication. Hence the function provides an economic and efficient method of identifying persons at high cardiovascular risk who need preventive treatment and persons at low risk who need not be alarmed about one moderately elevated risk characteristic. (Author)

A76-37294 * **Effect of species on relative toxicity of pyrolysis products.** C. J. Hilado, W. H. Marcussen, A. Furst (San Francisco, University, San Francisco, Calif.), and H. A. Leon (NASA, Ames Research Center, Moffett Field, Calif.). *Journal of Combustion Toxicology*, vol. 3, May 1976, p. 125-134. 20 refs. Grant No. NsG-2039.

One of the principal factors in animal toxicity studies is the choice of animal species. A limited study of the relative toxicity of the pyrolysis products from cotton and wool indicated that values of concentrations and doses required to produce death in 50% of the test animals obtained with Swiss albino mice were approximately one-half the values obtained with Sprague-Dawley rats. The toxicity of cotton relative to that of wool was the same using Swiss albino mice or Sprague-Dawley rats. Rankings of relative toxicity appear to be more sensitive to differences in apparatus and procedure than to interspecies differences. (Author)

A76-37296 * **A study of the toxicology of pyrolysis gases from synthetic polymers.** W. Young (San Jose State University, San Jose, Calif.), C. J. Hilado (San Francisco, University, San Francisco, Calif.), D. A. Kourtides, and J. A. Parker (NASA, Ames Research Center, Moffett Field, Calif.). *Journal of Combustion Toxicology*, vol. 3, May 1976, p. 157-165. 6 refs.

An apparatus and procedure for evaluating the toxicity of pyrolysis gases from synthetic polymers are described. In each test, four Swiss albino mice are exposed in a 5-liter chamber to the gases from materials pyrolyzed at 700 C. The apparatus is simple in design, easy to clean, inexpensive and gives reproducible results. Data on several fluorine-containing and polyamide polymers are presented. (Author)

A76-37297 **An animal exposure test system for large scale fire tests.** J. G. Gaume (Douglas Aircraft Corp., Long Beach, Calif.). *Journal of Combustion Toxicology*, vol. 3, May 1976, p. 166-188. 6 refs.

An animal exposure test system has been designed and fabri

cated for collecting physiological and environmental (temperature) data from animal subjects exposed to combustion gases in large-scale fire tests. The system consists of an open wire mesh and a two-compartment cage, one containing an exercise wheel for small rodents and the other containing one rat instrumented externally for electrocardiogram (ECG) and respiration. Cage temperature is measured by a thermistor located in the upper portion of the rat compartment. The temperature range recorded is 10 C to 100 C. Endpoints observed are bradycardia, cardiac arrhythmias, changes in respiratory pattern, respiratory arrest, and cardiac arrest. The ECG record is also a good method of monitoring animal activity as indicated by an increase in noise on the record during increased activity of the torso musculature. Examples of the recordings are presented and discussed as to their significance regarding toxicity of fire gases. (Author)

A76-37299 # **Medical examination of ground-based specialists in military-transport aviation (Meditsinskoe obsledovanie nazemnykh aviatsionnykh spetsialistov voenno-transportnoi aviatsii).** K. V. Kurdiaev, P. G. Kozacha, I. R. Grishin, V. V. Pekshev, K. V. Seliverstov, and A. S. Stefanov. *Voenno-Meditsinskii Zhurnal*, Apr. 1976, p. 58-60. In Russian.

Possible changes affecting the cardio-vascular and nervous systems and aural function of ground-based specialists servicing military-transport aircraft as the result of their professional duties were investigated. Immediately following work on heavy military transport aircraft in an aerodrome, many of the subjects complained of noise in the ears, headaches, and fatigue. Increased pulse rates and blood pressure were observed in a significant percentage of the subjects. The abdominal reflex was lowered in 25% of the subjects, and there was evidence of the development of functional cortical pyramid insufficiency in a number of cases. It is recommended that ground specialists servicing heavy military transport aircraft be carefully monitored for the development of hearing loss and for hypertension, ulcers, and other stress-related conditions. C.K.D.

A76-37300 # **Early signs of coronary arteriosclerosis in pilots (Rannie priznaki koronarnogo ateroskleroza u letchikov).** A. K. Ushmarov, G. I. Sholokhova, and G. V. Somov. *Voenno-Meditsinskii Zhurnal*, Apr. 1976, p. 65, 66. In Russian.

Thorough physical examinations, including 12-lead electrocardiograms, glucose tolerance tests, determination of cholesterol level, and studies of the sulfhydril levels in blood serum proteins, were conducted on a group of pilots and technicians and repeated after a period of eight years. It was found that clinical symptoms of cardiac insufficiency develop suddenly in pilots, without previous warning. Early signs of coronary arteriosclerosis, including changes in the ECG, are frequently transient. Pain due to angina pectoris may be forgotten by the patient between examinations. On the basis of these observations, it is strongly recommended that flight crews be examined for symptoms of cardio-vascular illness yearly, and that specific inquiries be made to determine whether any pain in the chest region has been experienced. C.K.D.

A76-37344 # **Role of the hypothalamus-hypophysis region and the sympathoadrenal system in the organism responses in extremal /stress/ situations (Rol' gipotalamo-gipofizarnoi oblasti i simpatoadrenalovoi sistemy v reaktsiiakh organizma pri ekstremal'nykh /stressornykh/ situatsiiakh).** A. V. Tonkikh (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 7, Apr.-June 1976, p. 3-12. 99 refs. In Russian.

An examination of experimental findings along with relevant literature data reveals that the hypothalamus-hypophysis region constitutes an interface between the central nervous system and the endocrine system and is of prime importance in regulating the organism responses in stress situations. It is shown that this interface activates, through the sympathoadrenal system, the adaptive and defensive resources of the organism. S.D.

A76-37345 # **Metabolism of catecholamines under physical load in man and animals (Obmen katekholaminov pri fizicheskoi nagruzke u cheloveka i zhivotnykh).** E. Sh. Matlina and G. N. Kassil' (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 7, Apr.-June 1976, p. 13-42. 185 refs. In Russian.

The paper presents a review of experimental results and available literature data on the variations of cathecholamines in the blood and urine of trained humans and animals during physical work of varying duration and intensity. Particular attention is given to the changes occurring in the synthesis, storage, and metabolism of catecholamines in the adrenal glands, the heart, skeletal muscles, and the central nervous systems in animals under different types of physical work. It is shown that activation of the sympathoadrenal system under moderate physical loads turns to depletion of functions under highly intensive and prolonged physical loads. The findings disclosed several mechanisms responsible for changes in the excretion of catecholamines, their precursors and metabolites in urine and blood during physical work in man. S.D.

A76-37346 # **Effect of corticosteroids on hypothalamoreticulolimbic structures of the brain (Deistvie kortikosteroidov na gipotalamo-retikulo-limbicheskie obrazovaniia golovnogo mozga).** N. M. Malyshenko (Chernovitskii Gosudarstvennyi Meditsinskii Institut, Chernovtsy, Ukrainian SSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 7, Apr.-June 1976, p. 88-115. 182 refs. In Russian.

Steroid hormones have a strong effect on the functional state of the central nervous system due to the fact that they constitute a key link in the mechanism of feedback between the central nervous system and endocrine organs. Results are presented on the influence of corticosteroids on the self-regulation of functions in the structures of the hypothalamus and the reticulolimbic system. Possible regulatory levels in the hypothalamus-pituitary-adrenal cortex system are identified. S.D.

A76-37553 # **The prophylaxis of the disruption of external respiration in immersion (O profilaktike narushenii vneshnego dykhaniia v immersii).** Iu. N. Kamenskii and E. B. Shul'zhenko. *Kosmicheskie Issledovaniia*, vol. 14, May-June 1976, p. 474-476. 9 refs. In Russian.

Two groups of young men were subjected to immersion for 6 days, followed by 'head-pelvis' overload to three units for 300 seconds. In the course of immersion, one group of subjects underwent 1.5 hours of head-pelvis overload daily. Respiratory parameters of both groups were monitored. It was found that the group subjected to 'training periods' of overload during immersion suffered less disruption of external respiration when exposed to postimmersion overload. C.K.D.

A76-37806 **Ventilatory response to CO2 at rest and during positive and negative work in normoxia and hyperoxia.** M. Miyamura, H. T. Folgering, R. A. Binkhorst, F. D. J. Smolders, and F. Kreuzer (Nijmegen, Katholicke Universiteit, Nijmegen, Netherlands). *Pflügers Archiv*, vol. 364, no. 1, 1976, p. 7-15. 38 refs. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek.

Ventilation versus alveolar P(CO2) relationships were determined by the steady-state method in 6 normal male subjects at rest and during positive and negative work at one load in both normoxic and hyperoxic condition. In 5 subjects the slopes of the minute ventilation versus alveolar P(CO2) lines during positive and negative work increased in normoxia as compared with rest. The slopes of the minute ventilation versus alveolar P(CO2) lines in positive and in negative work were about the same in both normoxic and hyperoxic conditions. Major conclusions are that the disagreement between various authors on the change of the slope of the minute ventilation versus alveolar P(CO2) line may be due to the differences in the method of calculation of the slope or the method of the determination of these lines; the stimuli from the muscle spindles in the working muscle during exercise probably do not contribute to the

increase in ventilatory response to CO2, and the increased slope of the normoxic minute ventilation versus alveolar P(CO2) line during exercise may be due to the interaction of several factors. (Author)

**A76-38097 Habitable planets - Habitable worlds (Bewohnbare Planeten - Bewohnte Welten).** H. Löb (Giessen, Universität, Giessen, West Germany). *(Hermann-Oberth-Gesellschaft, Raumfahrtkongress, 24th, Garmisch-Partenkirchen, West Germany, Oct. 2-5, 1975.) Astronautik*, vol. 13, May-June 1976, p. 31-33. 5 refs. In German.

An investigation is conducted concerning the possibility of extraterrestrial life, taking into account questions regarding the existence of other planetary systems, the probability of their habitability, and the likelihood of a development of primitive or intelligent life on the habitable planets. It is found that under certain assumptions close to 1% of the stars might have habitable planets. A number of uncertain factors related to the origin of life and of civilizations, however, makes it impossible to arrive at a reasonable estimate regarding the probability to encounter another advanced civilization in attempts designed to establish contact with extraterrestrial intelligent beings. G.R.

# STAR ENTRIES

N76-26786*# Kanner (Leo) Associates, Redwood City, Calif.
**CHANGES IN THE RESISTANCE OF ANIMALS DURING 'KOSMOS-605 AND 782' BIOSATELLITE EXPERIMENTS**
L. V. Serova Washington NASA Jun. 1976 11 p refs Transl. into ENGLISH from Inst. of Med. and Biol. Probl., Ministry of Public Health USSR (Moscow), 1976 9 p
(Contract NASw-2790)
(NASA-TT-F-15489) Avail: NTIS HC $3.50 CSCL 06C

Findings are presented on clinical and physiological changes in rats after flights aboard Kosmos-605 and 782. Kosmos-605 and control rats had equal lifetimes, and their descendants did not differ from the control descendants in litter size, birth weight, body and organ weight dynamics, peripheral blood and bone marrow and resistance to anoxic anoxia. Test rats from both satellites had reduced postflight motor activity, which apparently facilitated readaptation to terrestrial gravity. Differences between test and vivarium control rats were less in Kosmos-782, apparently due to malfunction of the Kosmos-605 life support system. There were considerable individual differences in body weight, number of lymphocytes, and resistance of erythrocytes to hemolysis. It is concluded that maintenance of homeostasis at rest requires considerable exertion by the flight animals, and the possibility is raised that regulatory mechanisms are insufficient to maintain biological capabilities in activities under stress. Author

N76-26787*# Transemantics, Inc., Washington, D.C.
**PRELIMINARY RESULTS OF AN EXPERIMENT WITH MAMMALS ON THE 'KOSMOS-782' BIOLOGICAL SATELLITE**
N. N. Gurovskiy, O. G. Gazenko, A. M. Genin, Ye. A. Ilin, B. A. Adamovich, and A. A. Zlatorunskiy Washington NASA Jun. 1976 22 p Transl. into ENGLISH from Inst. of Med. and Biol. Probl. of the USSR Ministry of Public Health (Moscow), 1976 16 p
(Contract NASw-2792)
(NASA-TT-F-15492) Avail: NTIS HC $3.50 CSCL 06C

The research results during the flight of the 'Kosmos-782' biological satellites are described. The experiment involved the postflight examination of a large number of various representatives of the animal and vegetable kingdom after their experiencing artificial gravity created by an on-board centrifuge. Data are presented concerning mechanisms of adaptation of living systems to conditions of prolonged weightlessness and to subsequent readaptation to earth gravity. Author

N76-26788*# Kanner (Leo) Associates, Redwood City, Calif.
**CHANGE IN EQUILIBRIUM FUNCTION AND STATIC RESISTANCE IN RATS AFTER A 20 DAY LONG FLIGHT IN THE 'KOSMOS-782' SATELLITE**
A. R. Kotovskaya, A. A. Shipov, G. S. Ayzikov, and A. S. Markin Washington NASA Jun. 1976 12 p Transl. into ENGLISH from Inst. of Med. and Biol. Probl. of the USSR Ministry of Public Health, USSR (Moscow), 1976 8 p
(Contract NASw-2790)
(NASA-TT-F-15493) Avail: NTIS HC $3.50 CSCL 06C

Graphical data and photographs on the static resistance and equilibrium function dynamics of 12 SPF line rats as well as on ground model experiment and vivarium control animals were recorded before and after a 20 day flight in Kosmos-782. Static resistance was estimated by the time for hanging onto vertically suspended sticks and the equilibrium function by the time for leveling a see-saw on which the rats were placed. The changes in static resistance are explained by the specific effect of weightlessness, compensation for which is a longer process than compensation for the holding conditions. The equilibrium recovery dynamics indicate changes in the function of the vestibular apparatus. Author

N76-26789*# Scientific Translation Service, Santa Barbara, Calif.
**CHANGES IN THE BIOCHEMICAL INDICATORS OF THE BLOOD OF RATS FOLLOWING THE FLIGHT OF THE 'KOSMOS-782' BIOLOGICAL SATELLITE**
R. A. Tigranyan, I. A. Popova, M. I. Belyakova, N. F. Kalita, L. B. Sochilina, and Ye. G. Tuzova Washington NASA Jun. 1976 6 p Transl. into ENGLISH from Inst. of Med. and Biological Probl., Ministry of Health, USSR (Moscow), 1976 p 1-3
(Contract NASw-2791)
(NASA-TT-F-15490) Avail: NTIS HC $3.50 CSCL 06C

The results of studies conducted on male rats of the SPF line which were in space flight for 20 days aboard the 'Kosmos-782' biological satellite are reported. Author

N76-26790*# Scientific Translation Service, Santa Barbara, Calif.
**MORPHOLOGICAL INVESTIGATION OF THE ORGANS AND TISSUES OF ANIMALS AFTER FLIGHT ABOARD THE 'KOSMOS-782' SATELLITE**
V. V. Portugalov, Ye. A. Savina, A. S. Kaplanskiy, G. N. Durnova, and A. S. Pankova Washington NASA Jun. 1976 8 p Transl. into ENGLISH from Inst. of Med. and Biol. Probl. of the USSR Ministry of Public Health, Moscow (USSR), 1976 p 1-6
(Contract NASw-2791)
(NASA-TT-F-15494) Avail: NTIS HC $3.50 CSCL 06C

A study is made of the morphological manifestations of reactions of the intact organism in response to the prolonged stay of animals under conditions of weightlessness. Animals from the Kosmos-782 satellite were used. Author

N76-26791*# Scientific Translation Service, Santa Barbara, Calif.
**ROLE OF MONOVALENT CATIONS IN THE MEMBRANE ORGANIZATION OF MODERATELY HALOPHILIC BACTERIA**
Masui Masamiki, Otani Eiichi, and Kato Keiya Washington NASA Jun. 1976 24 p refs Transl. into ENGLISH from Tokyo Daigaku, Oyo Biseibutsu Kenkyujo Symp. (Japan), v. 11, 1969 p 65-79
(Contract NASw-2791)
(NASA-TT-F-17030) Avail: NTIS HC $3.50 CSCL 06M

The optimum growth conditions for slightly halophilic, moderately halophilic, and highly halophilic bacteria are reviewed, and the occurence of halophilic bacteria in nature is examined (i.e., in salt lakes, salted meat). The optimum sodium chloride concentrations needed for growth of moderately halophilic bacteria was experimentally investigated. A synthetic medium suitable for growth of the bacteria is described. The wild strains of Pseudomonas sp. and Micrococcus sp. were chosen for study in the experimental investigation. The effects of desalinization on bacterial growth, and specifically the rupturing of cell membranes, were studied. Results indicate that cell wall ruptures occurring during desalinization happen because of sodium ion depletion. The role of other ions, magnesium and potassium, in regulating the amount of sodium ions in the cell membranes is discussed. However, results also show that the sodium ion plays no part in the prevention of cell wall rupture because of osmotic pressure changes in the plasma mambranes. Data are given on the chemical composition of the cell walls of the bacteria, and photographs are shown of the ruptured cell walls. J.R.T.

N76-26792*# Scientific Translation Service, Santa Barbara, Calif.
**A MANUAL ON THE STUDY OF BIOLOGICAL OXIDATION BY THE POLAROGRAPHIC METHOD**
Ye. A. Kovalenko Washington NASA Jun. 1976 33 p refs Transl. into ENGLISH from the book "Rukovodstvo po Izucheniyu Biologicheskogo Okisleniya Polyarograficheskim Metodam" Moscow, Nauka Press, 1973 p 192-213
(Contract NASw-2791)
(NASA-TT-F-17040) Avail: NTIS HC $4.00 CSCL 06C

A detailed investigation is made of the stages in PO2 cascades, and a diagram is given of the dynamics of CO2 in the organism. Experiments to explain what happens in the blood and tissues of the brain when there is a great decrease in PCO2 in the organism are described. Author

N76-26793*# Joint Publications Research Service, Arlington, Va.
**NEW DATA ON CIRCADIAN BIORHYTHMICITY OF WAKEFULNESS AND SLEEP IN VERTEBRATES**
I. G. Karmanova Washington NASA Apr. 1976 9 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 225, no. 6, 21 Dec. 1975 p 1457-1460
(NASA Order W-13183)
(NASA-TT-F-16986) Avail: NTIS HC $3.50 CSCL 06C

Data are presented on the circadian periodicity of wakefulness and sleep. The material was obtained on the basis of a study of the species-specific features of diurnal periodicity in fish, amphibians, reptiles, and birds. The total duration of wakefulness and sleep at different times of the day was compared in different vertebrate species which conduct daytime and nocturnal lives. The probability coefficient of the transition of one state into the other in both the daytime and nocturnal periods was determined. Results are discussed. J.M.S.

N76-26794 Georgia Inst. of Tech., Atlanta.
**AN EXPERIMENTAL INVESTIGATION OF STEADY AND PULSATILE FLOW THROUGH PARTIAL OCCLUSIONS IN A RIGID TUBE Ph.D. Thesis**
Robert Anthony Cassanova 1975 279 p
Avail: Univ. Microfilms Order No. 76-12615

Steady and pulsatile water flow through an axisymmetric constriction in a rigid tube was investigated to study the problem of subtotal vascular stenosis occurring with arteriosclerosis. Dye tracers were employed to visualize the flow field structure in both steady and pulsatile flow. Vortex shedding in the near distal region, the break-up of the vortices into random turbulence and wall interactions were observed and photographed. The sharp-edged occlusions produced flow instabilities at a lower Reynolds number than did the contoured occlusion. The presence of highly turbulent flow fields distal to the modelled stenoses implies that turbulence can be a factor in the development of postenotic dilatation. Slight degrees of stenosis produced detectable turbulence in pulsatile flow. This fact suggests that the initial formation of occlusions could be detected long before audible turbulence is produced if more sensitive diagnostic instruments could be utilized in clinical practice. Dissert. Abstr.

N76-26795 Oklahoma Univ., Norman.
**MOTION SICKNESS SUSCEPTIBILITY: VESTIBULAR AND NONVESTIBULAR CHARACTERISTICS Ph.D. Thesis**
James Michael Lentz 1975 97 p
Avail: Univ. Microfilms Order No. 76-14091

The relationships between motion sickness susceptibility and measures of nystagmus and sensations of rotation are studied. Secondary areas of interest included the relationship of motion sickness susceptibility to subjective alertness and anxiety; the duration of spiral aftereffect illusions, and psychomotor performance in vestibularly static and dynamic environments. From the rotation trials, it was concluded that the primary vestibular responses studied (nystagmus and sensation of rotation) were not differentially expressed in susceptible and nonsusceptible individuals. The traditional notion that susceptibility is merely a reflection of the sensitivity of an individual's vestibular system was not supported. The results did provide partial support for Graybiel's theory which proposes that the difference between susceptible and nonsusceptible individuals is determined either by the secondary vestibular response system (V-II system) or by intervening factors which mediate or influence the transmission of vestibular signals to the V-II system. Dissert. Abstr.

N76-26796 Pennsylvania Univ., Philadelphia.
**HUMAN TEMPERATURE REGULATION AND THE PERCEPTION OF THERMAL COMFORT Ph.D. Thesis**
Raymond Clifford Hawkins 1975 163 p
Avail: Univ. Microfilms Order No. 76-12286

Human thermoregulatory reactions to internal and external sources of thermal stress were studied at three interrelated levels of measurement: (1) physiological thermoregulatory reactions (sweating and shivering reports), (2) behavioral thermoregulatory reactions, and (3) alternations in thermal consciousness, i.e., systematic shifts in the perceived pleasantness/unpleasantness of external thermal stimuli. A major aim was to test the hypothesis that thermal comfort and thermoregulatory behavior are closely related to changes in internal body temperature (a phenomenon called thermal alliesthesia). The overall findings are that (1) warmer stimulus temperatures are behaviorally preferred and perceived as pleasant as internal temperature was lowered, and (2) cooler temperatures were perferred and perceived as pleasant as internal temperature was raised. Dissert. Abstr.

N76-26799*# National Aeronautics and Space Administration, Washington, D.C.
**FOUNDATIONS OF SPACE BIOLOGY AND MEDICINE, VOLUME 1: SPACE AS A HABITAT**
Melvin Calvin, ed. and Oleg G. Gazenko, ed. NASA and Acad. of Sci., USSR 1975 458 p refs Prepared in cooperation with Acad. of Sci. (USSR), Moscow Original contains color illustrations 3 Vol.
(NASA-SP-374-Vol-1; LC-74-600174-Vol-1) Avail: NTIS MF $2.25; SOD HC $11.75 CSCL 06F

Cosmological aspects of the universe are discussed in relation to exobiological research in the context of modern biochemistry and biophysics.

N76-26805* Academy of Sciences (USSR), Moscow. Inst. of Microbiology.
**BIOLOGICAL EFFECTS OF EXTREME ENVIRONMENTAL CONDITIONS**
A. A. Imshenetskiy *In* NASA, Washington, Found. of Space Biol. and Med., Vol. 1 1975 p 271-320 refs

CSCL 06F

Actions of extreme physical and chemical space factors on microorganisms and plants are elaborated in order to establish limits for the biosphere. Considered are effects of low and high temperatures; ionizing and ultraviolet radiation; various gases; and effects of vibration, desiccation and acceleration. G.G.

N76-26806* Academy of Sciences (USSR), Moscow. Inst. of Biochemistry.
**THEORETICAL AND EXPERIMENTAL PREREQUISITES OF EXOBIOLOGY**
A. I. Oparin *In* NASA, Washington Found. of Space Biol. and Med., Vol. 1 1975 p 321-367 refs

CSCL 06F

Evolutionary development of carbon compounds in the initial formation of life on earth is traced through two paths of nucleosynthesis: one, stable, is related to the mechanism of stellar radiation in stable stars; and the other unstable, is related to supernovae bursts. The possibility of abionic synthesis of biologically significant compounds was demonstrated in model tests for biomonomers and biopolymers. G.G.

N76-26807* Moscow State Univ. (USSR). Problem Lab. of Space Biology.
**SEARCH FOR AND INVESTIGATION OF EXTRATERRESTRIAL FORMS OF LIFE**
A. B. Rubin *In* NASA, Washington Found. of Space Biol. and Med., Vol. 1 1975 p 368-402 refs

CSCL 06F

Correct combinations of remote, analytic, and functional methods and measuring devices for detecting extraterrestrial life are elaborated. Considered are techniques and instruments available both on earth and aboard spacecraft and artificial planetary satellites. Emphasis is placed on the abiogenetic synthesis of organic compounds formed in photosynthesis on Mars. G.G.

N76-26808* National Aeronautics and Space Administration, Washington, D.C.
**PLANETARY QUARANTINE: PRINCIPLES, METHODS, AND PROBLEMS**
Lawrence B. Hall *In its* Found. of Space Biol. and Med., Vol. 1

1975 p 403-430 refs
CSCL 06F

Requirements for planetary quarantine programs focus on microbial life forms as the primary contamination threat carried by spacecraft to a planet, or back to earth from another planet or outer space. Constraints on planetary flight missions and forthcoming Martian landings are depicted. G.G.

N76-26809*# National Aeronautics and Space Administration, Washington, D.C.
**FOUNDATIONS OF SPACE BIOLOGY AND MEDICINE. VOLUME 2, BOOK 1: ECOLOGICAL AND PHYSIOLOGICAL BASES OF SPACE BIOLOGY AND MEDICINE**
Melvin Calvin, ed. and Oleg G. Cazenko, ed. NASA and Acad. of Sci., USSR 1975 415 p refs Prepared in cooperation with Acad. of Sci. (USSR), Moscow 3 Vol.
(NASA-SP-374-Vol-2-Bk-1; LC-74-600174-Vol-2-Bk-1) Avail: NTIS MF $2.25; SOD HC $9.40 CSCL 06S

Barometric pressure, gas composition, toxicity, and thermal exchange of spacecraft cabin atmospheres are discussed. Effects of gravitation, acceleration, weightlessness, noise, and vibration on human behavior and performance during space flight are also described.

N76-26810* Ministry of Health of the USSR, Moscow.
**BAROMETRIC PRESSURE AND GAS COMPOSITION**
V. B. Malkin *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 3-64 refs

CSCL 06K

Many factors affecting artificial gas atmosphere, which is used to maintain life during space flight, are considered. The wide variability of barometric pressure in spacecraft, due in large measure to spacecraft design is discussed. Explosive decompression is described; this develops from instantaneous depressurization of the cabin. Decompression sickness is reviewed, including bubble growth and evolution of gas bubbles in organisms. Dysbarism, hypoxia, and hypercapnia are also discussed. J.A.M.

N76-26811* National Academy of Sciences - National Research Council, Washington, D.C.
**TOXICOLOGY OF THE AIR IN CLOSED SPACES**
Ralph C. Wands *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 65-93 refs

CSCL 06T

Sources and identification of contaminants in artificial gas atmospheres are discussed. They include biological sources (microflora and man), materials, processes, aerosols, and malfunctions. Acute or chronic toxicity may result from spacecraft air contamination. Air quality standards are presented in tabular form. J.A.M.

N76-26812* Webb Associates, Yellow Springs, Ohio.
**THERMAL EXCHANGES AND TEMPERATURE STRESS**
Paul Webb *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 94-126 refs

CSCL 06S

Thermal comfort during space flight is discussed. Heat production of man during space flight and wear loss as a mean of dissipating heat are described. Water cooled garments are also considered, along with tolerance for extreme heat and body heat storage. Models of human temperature regulation are presented in the form of documented FORTRAN programs. J.A.M.

N76-26813* California Univ., Davis.
**PRINCIPLES OF GRAVITATIONAL BIOLOGY**
Arthur H. Smith *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 129-162 refs

CSCL 06S

Physical principles of gravitation are enumerated, including gravitational and inertial forces, weight and mass, weightlessness, size and scale effects, scale limits of gravitational effects, and gravity as biogenic factor. Statocysts, otolithic organs of vertebrates, gravity reception in plants, and clinostat studies for gravitation orientation are reviewed. Chronic acceleration is also studied, as well as physiology of hyper and hypodynamic fields. Responses of animals to a decreased acceleration field are examined, considering postural changes, work capacity, growth, and physiologic deadaptation. J.A.M.

N76-26814* Ministry of Health of the USSR, Moscow.
**PROLONGED LINEAR AND RADIAL ACCELERATIONS**
P. V. Vasilyev and A. R. Kotovskaya *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 163-213 refs
CSCL 06S

Overall acceleration effects on the body and man's resistance to it are presented, including endurance limits, acceleration tolerances, and aftereffects. These effects on individual body systems are described for: (1) cardiovascular system, (2) respiratory system, (3) vision, (4) central nervous system, (5) endocrine glands, (6) gastrointestinal tract, and (7) renal system. Work capacity effects are also noted. J.A.M.

N76-26815* Air Force Systems Command, Wright-Patterson AFB, Ohio.
**IMPACT ACCELERATIONS**
Henning E. VonGierke and James W. Brinkley *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 214-246 refs
CSCL 06S

The degree to which impact acceleration is an important factor in space flight environments depends primarily upon the technology of capsule landing deceleration and the weight permissible for the associated hardware: parachutes or deceleration rockets, inflatable air bags, or other impact attenuation systems. The problem most specific to space medicine is the potential change of impact tolerance due to reduced bone mass and muscle strength caused by prolonged weightlessness and physical inactivity. Impact hazards, tolerance limits, and human impact tolerance related to space missions are described. J.A.M.

N76-26816* Naval Aerospace Medical Inst., Pensacola, Fla.
**ANGULAR VELOCITIES, ANGULAR ACCELERATIONS, AND CORIOLIS ACCELERATIONS**
Ashton Graybiel *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 247-304 refs

CSCL 06S

Weightlessness, rotating environment, and mathematical analysis of Coriolis acceleration is described for man's biological effective force environments. Effects on the vestibular system are summarized, including the end organs, functional neurology, and input-output relations. Ground-based studies in preparation for space missions are examined, including functional tests, provacative tests, adaptive capacity tests, simulation studies, and antimotion sickness. J.A.M.

N76-26817* Federal Aviation Administration, Washington, D.C.
**WEIGHTLESSNESS**
I. D. Pestov (Central Aviation Hospital, Moscow) and Siegfried J. Gerathewohl *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 305-354 refs

CSCL 06S

Significance of gravitation forces in regulating homeostasis is discussed, along with weightlessness effects on humans and a state of reduced weight (subgravity), such as on the moon. Biomedical effects of weightlessness adaptation to zero G and readaptation to terrestrial gravitation are described for the nervous system, cardiovascular system, metabolism, and musculoskeletal system. Reactions caused primarily by: (1) changes in the afferent nervous system, (2) lack of hydrostatic blood pressure, (3) lack of weight on the musculoskeletal system, and (4) exposure limits derived from the effects of prolonged weightlessness on humans are reviewed. Protection of humans from adverse effects of weightlessness is considered; Skylab missions are also summarized. J.A.M.

**N76-26818*** Air Force Systems Command, Wright-Patterson AFB, Ohio.
**NOISE AND VIBRATION**
Henning E. VonGierke, Charles W. Nixon, and John C. Guignard (Dayton Univ.) *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 1 1975 p 355-405 refs

CSCL 06S

The characteristics of acoustic energy and protection of humans from noise during space flight are described. Vibration characteristic factors are also discussed, including the variety of vibration, systems and resonance, spacecraft operations, biodynamics, physiological and psychological effects, and subjective reactions. The criteria and limits for human exposure are cited. J.A.M.

**N76-26819*#** National Aeronautics and Space Administration, Washington, D.C.
**FOUNDATIONS OF SPACE BIOLOGY AND MEDICINE. VOLUME 2, BOOK 2: ECOLOGICAL AND PHYSIOLOGICAL BASES OF SPACE BIOLOGY AND MEDICINE**
Melvin Calvin, ed. and Oleg G. Gazenko, ed. NASA and Acad. of Sci., USSR 1975 756 p refs Prepared in cooperation with Acad. of Sci., (USSR), Moscow 3 Vol.
(NASA-SP-374-Vol-2-Bk-2; LC-74-600174-Vol-2-Bk-2) Avail: NTIS MF $2.25; SOD HC $8.80 CSCL 06S

The influence on living organisms of radiant energy, the psychophysical problems of space flight, methods of physiological investigations in flight, and the transmission of information are considered.

**N76-26820*** Rochester Univ., N.Y.
**RADIO-FREQUENCY AND MICROWAVE ENERGIES, MAGNETIC AND ELECTRIC FIELDS**
Sol M. Michaelson *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 409-452 refs

CSCL 06R

The biological effects of radio frequency, including microwave, radiation are considered. Effects on body temperature, the eye, reproductive systems, internal organs, blood cells, the cardiovascular system, and the central nervous system are included. Generalized effects of electric and magnetic fields are also discussed. Experimentation with animals and clinical studies on humans are cited, and possible mechanisms of the effects observed are suggested. D.M.L.

**N76-26821*** California Univ., San Diego.
**ULTRAVIOLET, VISIBLE, AND INFRARED RAYS**
John H. Taylor and A. A. Letavet (Acad. of Sci., USSR) *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 453-472 refs

CSCL 06R

Sources of infrared, visible and ultraviolet radiation are discussed, and important associated biological and psychophysiological effects are described. The problem of protection from excessively high or low levels of radiant energy in these spectral regions is considered and optimal levels are suggested. Author

**N76-26822*** California Univ., Berkeley.
**IONIZING RADIATION**
Cornelius A. Tobias and Yu. G. Grigoryev (Ministry of Health USSR) *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 473-531 refs

CSCL 06R

The biological effects of ionizing radiation encountered in space are considered. Biological experiments conducted in space and some experiences of astronauts during space flight are described. The effects of various levels of radiation exposure and the determination of permissible dosages are discussed. D.M.L.

**N76-26823*** Air Force Systems Command, Brooks AFB, Tex.
**BIOLOGICAL AND PHYSIOLOGICAL RHYTHMS**
Hubertus Strughold and Henry B. Hale *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 535-570 refs
CSCL 06P

Circadian rhythms, particularly that of sleep and wakefulness, are discussed. The sleep-wakefulness experiences of astronauts during several space missions are described, and predictions are made for future space activities, including Mars missions, interstellar flight, and life on permanent space stations. D.M.L.

**N76-26824*** Ministry of Health of the USSR, Moscow.
**PHYSIOLOGY OF THE SENSORY SPHERE UNDER SPACE-FLIGHT CONDITIONS**
Ye. M. Yuganov and V. I. Kopanev (Military Medical Acad. USSR) *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 571-599 refs

CSCL 06S

Information regarding the influence on sensory perception of certain space flight factors, including weightlessness, acceleration, and vibration, is presented. Several illusions which occur under these conditions are described. The results of ground based experiments are also discussed. D.M.L.

**N76-26825*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**ASTRONAUT ACTIVITY**
Joseph P. Loftus, Jr., Robert L. Bond, and Rollin M. Patton *In its* Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 600-636 refs
CSCL 06S

Human factors pertinent to the design and operation of spacecraft are considered. The geometric characteristics of spacecraft that define the degree and type of confinement imposed on the crew and the character of equipment management and housekeeping necessary for hygiene, comfort and safety are discussed. The controls and displays of various spacecraft are described to indicate the degree to which crew functions become integral to functions of the total spacecraft. The contributions of the crew to system reliability and performance are summarized and the increasing significance of the crew's role in scientific observation and experimentation is noted. Author

**N76-26826*** Academy of Sciences (USSR), Pushchino.
**COMBINED EFFECT OF FLIGHT FACTORS**
V. V. Antipov, B. I. Davydov (Ministry of Health USSR), V. V. Verigo (Ministry of Health USSR), and Yu. M. Svirezhev (Ministry of Health USSR) *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 639-667 refs

CSCL 06S

The effects of various combinations of space flight stresses are discussed. Included are weightlessness, acceleration, vibration, ionizing radiation, hypoxia, and ambient temperature. The problem of constructing mathematical models to describe the dynamics of biological systems, including those to analyze and predict adaptation and restoration processes following combined stresses, is also considered. D.M.L.

**N76-26827*** Ministry of Health of the USSR, Moscow.
**METHODS OF INVESTIGATION IN SPACE BIOLOGY AND MEDICINE, TRANSMISSION OF BIOMEDICAL DATA**
R. M. Bayevskiy and W. Ross Adey (Calif. Univ., Los Angeles) *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 668-706 refs

CSCL 06B

Methods for in-flight monitoring of the cardiovascular system, respiratory system, vestibular system, central nervous system, and the musculoskeletal systems are described. Methods of data analysis are also discussed. D.M.L.

N76-26828* Ministry of Health of the USSR, Moscow.
**BIOLOGIC GUIDELINES FOR FUTURE SPACE RESEARCH**
G. P. Parfenov *In* NASA, Washington Found. of Space Biol. and Med., Vol. 2, Bk. 2 1975 p 707-739 refs

CSCL 06B

Biological experiments conducted onboard balloons, rockets, and spacecraft are described. The effects of aerospace environments on microorganisms, plants, and invertebrate animals were examined. D.M.L.

N76-26829*# National Aeronautics and Space Administration, Washington, D.C.
**FOUNDATIONS OF SPACE BIOLOGY AND MEDICINE. VOLUME 3: SPACE MEDICINE AND BIOTECHNOLOGY**
Melvin Calvin, ed. and Oleg G. Gazenko, ed. NASA and Acad. of Sci., USSR 1975 542 p refs Prepared in cooperation with Acad. of Sci., (USSR), Moscow 3 Vol.
(NASA-SP-374-Vol-3; LC-74-600174-Vol-3) Avail: NTIS MF $2.25; SOD HC $11.00 CSCL 06K

The results of medical and biological research in space are presented. Specific topics discussed include: methods of providing life support systems for astronauts, characteristics of integrated life support systems, protection against adverse factors of space flight, selection and training of astronauts, and future space biomedical research.

N76-26830* California Univ., Berkeley.
**BASIC DATA FOR PLANNING LIFE-SUPPORT SYSTEMS**

Doris Howes Calloway *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 3-21 refs

CSCL 06K

Nutritional, physiological, and metabolic requirements of terrestrial man are briefly reviewed in terms of manned space flight. Emphasis is placed on designing life-support systems based on experiences and accumulated data from actual space missions. J.M.S.

N76-26831* Military Medical Academy (USSR), Leningrad. Lab. of Nutrition.
**FOOD AND WATER SUPPLY**
I. G. Popov *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 22-55 refs

CSCL 06K

Supplying astronauts with adequate food and water on short and long-term space flights is discussed based on experiences gained in space flight. Food consumption, energy requirements, and suitability of the foodstuffs for space flight are among the factors considered. Physicochemical and biological methods of food production and regeneration of water from astronaut metabolic wastes, as well as wastes produced in a closed ecological system, or as a result of technical processes taking place in various spacecraft systems are suggested for long-term space flights. J.M.S.

N76-26832* Ministry of Health of the USSR, Moscow. Inst. of Biomedical Problems.
**AIR REGENERATING AND CONDITIONING**
B. G. Grishayenkov *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 56-110 refs

CSCL 06K

Various physicochemical methods of regenerating and conditioning air for spacecraft are described with emphasis on conditions which affect efficiency of the system. Life support systems used in closed, hermetically sealed environments are discussed with references to actual application in the Soviet Soyuz and Voskhod manned spacecraft. Temperature and humidity control, removal of carbon dioxide, oxygen regeneration, and removal of bacteria and viruses are among the factors considered. J.M.S.

N76-26833* Ministry of Health of the USSR, Moscow. Inst. of Biomedical Problems.
**CLOTHING AND PERSONAL HYGIENE**
A. M. Finogenov, A. N. Azhayev, and G. V. Kaliberdin *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 111-130 refs
CSCL 06K

The biomedical maintenance of astronauts is discussed in terms of personal hygiene. Principal characteristics and general requirements are described which must be followed in perfecting a system of hygienic practices and in devising means to maintain personal hygiene, flight clothing, underwear, bedding, and medical-domestic equipment for manned space flights of varying durations. Factors discussed include: disposable clothing, thermal protection, oral hygiene, cleansing of the skin, and grooming of the hair. J.M.S.

N76-26834* Ministry of Health of the USSR, Moscow. Inst. of Biomedical Problems.
**ISOLATION AND REMOVAL OF WASTE PRODUCTS**
V. V. Borshchenko *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 131-156 refs

CSCL 06K

Methods of isolation and elimination of waste products in spacecraft cabins are described. The role of waste products in the environment, collection and transport of waste products to storage containers, or to recovery systems, preservation of waste products, and storage and removal of waste products are among the factors discussed. Regeneration of the waste products to recover water and/or oxygen, is briefly considered. J.M.S.

N76-26835* Ministry of Health of the USSR, Moscow. Inst. of Biomedical Problems.
**HABITABILITY OF SPACECRAFT**
Yu. A. Petrov *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 157-192 refs

CSCL 06K

Habitability is discussed in terms of the degree of comfort and aesthetics necessary for the living, working, and resting conditions of the human operator. Organization of astronaut work regime, illumination of spacecraft working and living areas, and color are among the factors considered. J.M.S.

N76-26836* National Aeronautics and Space Administration, Washington, D.C.
**INDIVIDUAL LIFE-SUPPORT SYSTEMS OUTSIDE A SPACECRAFT CABIN, SPACE SUITS AND CAPSULES**

Walton L. Jones *In its* Found. of Space Biol. and Med., Vol. 3 1975 p 193-223 refs
CSCL 06K

Space suit systems, physiological and operational requirements, and the technologic advances incorporated in the more advanced suits are described. Free space extravehicular activity (EVA), lunar surface EVA, and various EVA aids are considered. J.M.S.

N76-26837* Ministry of Health of the USSR, Moscow. Inst. of Biomedical Problems.
**NONREGENERATIVE LIFE-SUPPORT SYSTEMS FOR FLIGHTS OF SHORT AND MODERATE DURATION**
B. A. Adamovich *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 227-246 refs

CSCL 06K

The basic requirements for crew life support systems of flights of up to 30 days are described. Food products, drinking water, oxygen for breathing, and sanitary-technical facilities are among the factors considered. Life support systems utilized on Vostok, Voskhod, Soyuz, Gemini, Mercury, and Apollo are discussed. J.M.S.

N76-26838* National Aeronautics and Space Administration, Washington, D.C.

**LIFE-SUPPORT SYSTEMS FOR INTERPLANETARY SPACECRAFT AND SPACE STATIONS FOR LONG-TERM USE**

Walton L. Jones *In its* Found. of Space Biol. and Med., Vol. 3 1975 p 247-273 refs
CSCL 06K

Integrated regenerative life support systems in which the by-products of one system become useful material for another are considered. Regeneration or reclamation of water and the principal atmospheric gases, and elimination or disposition of waste products are the principal functions of such systems. A modular system concept is described. Features of this system include: commonality (for spares reduction), maintainability, overall computer-monitored functioning, and onboard repair and replacement tasks in the event of failure. J.M.S.

**N76-26839*** Ministry of Health of the USSR, Moscow. Inst. of Biomedical Problems.
**BIOLOGICAL LIFE-SUPPORT SYSTEMS**
Ye. Ya. Shepelev *In* NASA, Wahington Found. of Space Biol. and Med., Vol. 3 1975 p 274-308 refs

CSCL 06K

The establishment of human living environments by biologic methods, utilizing the appropriate functions of autotrophic and heterotrophic organisms is examined. Natural biologic systems discussed in terms of modeling biologic life support systems (BLSS), the structure of biologic life support systems, and the development of individual functional links in biologic life support systems are among the factors considered. Experimental modeling of BLSS in order to determine functional characteristics, mechanisms by which stability is maintained, and principles underlying control and regulation is also discussed. J.M.S.

**N76-26840*** Ministry of Health of the USSR, Moscow. Inst. of Biomedical Problems.
**PROTECTION AGAINST RADIATION (BIOLOGICAL, PHARMACOLOGICAL, CHEMICAL, PHYSICAL)**
P. P. Saksonov *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 311-344 refs

CSCL 06R

Physical, chemical, and biological protection for astronauts from penetrating radiation on long-term space flights is discussed. The status of pharmacochemical protection, development of protective substances, medical use of protective substances, protection for spacecraft ecologic systems, adaptogens and physical conditioning, bone marrow transplants and local protection are discussed. Combined use of local protection and pharmacochemical substances is also briefly considered. J.M.S.

**N76-26841*** Texas Univ., Houston.
**MEDICAL CARE OF SPACECREWS, (MEDICAL CARE, EQUIPMENT, AND PROPHYLAXIS)**
Charles A. Berry *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 345-371 refs

CSCL 06E

Treatment and prevention of the physiologic problems of spacecrews are discussed. Preflight procedures, inflight monitoring and medication, and postflight examination are described. Specific factors covered include: medical screening and astronaut selection; health stabilization and exposure prevention; preflight medical examinations and training; biomedical data; medical kits; diagnosis and treatment; and implications of postflight findings. J.M.S.

**N76-26842*** Texas Univ., Houston.
**DESCENT AND LANDING OF SPACECREWS AND SURVIVAL IN AN UNPOPULATED AREA**
Charles A. Berry *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 372-394 refs

CSCL 06S

Medical and physiologic experience gained in space flight programs of the U.S. and U.S.S.R. is described in relation to acceleration forces in the final phases of manned space flight. Application of this knowledge to future programs, survival in the postlanding period, and survival provisions currently made for spacecrews are discussed. J.M.S.

**N76-26843*** Military Medical Academy (USSR), Leningrad.
**PROTECTION OF CREWS OF SPACECRAFT AND SPACE STATIONS**
I. N. Chernyakov *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 395-416 refs

CSCL 06K

A survey is presented of research on life support for astronauts in emergency situations during flight. Depressurization of the spacecraft cabin, fire, and failure of air regeneration and conditioning systems of manned compartments are among the emergencies considered. J.M.S.

**N76-26844*** Ministry of Health of the USSR, Moscow.
**SELECTION OF ASTRONAUTS AND COSMONAUTS**
N. N. Gurovskiy, I. I. Bryanov, and Mae Mills Link *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 419-437 refs
CSCL 05I

The process by which the U.S. and U.S.S.R. selected astronauts and cosmonauts for early manned space flights is described. Emphasis is placed on medical criteria. J.M.S.

**N76-26845*** Ministry of Health of the USSR, Moscow.
**TRAINING OF COSMONAUTS AND ASTRONAUTS**
N. N. Gurovskiy and Mae Mills Link *In* NASA, Washington Found. of Space Biol. and Med., Vol. 3 1975 p 438-450 refs
CSCL 05I

The biomedical and preflight training of spacecraft crews is discussed based on a survey of scientific and technical literature in the U.S. and U.S.S.R. Experience gained from high velocity and high altitude aircraft flights, predictions of human reactions and theoretical models of human adaptation to the new environment of space, and actual spaceflight experience provided scientists and specialists with data from which the state of human health in space could be predicted and life support measures developed. J.M.S.

**N76-26846*** National Aeronautics and Space Administration, Washington, D.C.
**AN APPRAISAL OF FUTURE SPACE BIOMEDICAL RESEARCH**
Sherman P. Vinograd *In its* Found. of Space Biol. and Med., Vol. 3 1975 p 453-479 refs

CSCL 06B

Three general classes of manned space flight missions of the future are described. These include: earth-orbital, lunar, and planetary. Biomedical science and technology is analyzed, emphasizing areas of research needed to support future manned space flights and the information to be obtained from them. Author

**N76-26847#** Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
**INTERNAL RADIOACTIVE CONTAMINATION IN SELECTED GROUPS OF CRNL EMPLOYEES**
D. W. S. Evans Oct. 1975 18 p refs Sponsored by ERDA (AECL-5255) Avail: NTIS Avail: ERDA Depository Libraries HC $3.50; AECL $0.50

This report details the development and execution of a 30 month program designed to characterize the magnitude and distribution of internal radioactive contamination amongst selected groups of employees at Chalk River Nuclear Laboratories, using a shadow shield whole-body counter. The results show that the levels of contamination in these employees are very low, and no contaminant was present in amounts exceeding 10% of the maximum permissible body burden. Details of the time course of some of the body burdens are also furnished. Author (ERA

N76-26848# Los Alamos Scientific Lab., N.Mex.
**CONSIDERATIONS IN THE ASSESSMENT OF PLUTONIUM DEPOSITION IN MAN**
G. Voelz, J. Umbarger, J. McInroy, and J. Healy 1975 19 p refs Presented at IAEA Intern. Seminar on Diagn. and Treat. of Incorp. Radionuclides, Vienna, Austria, 8 Dec. 1975
(Contract W-7405-eng-36)
(LA-UR-75-1887; Conf-751205-4) Avail: NTIS HC $4.50

Data from human cases of plutonium inhalation are used to illustrate several important problems in the current methods of estimating plutonium body burdens. Individuals exposed to 238 $PuO_2$ particles in a highly insoluble matrix showed an unusually slow rising urinary excretion curve over 300 to 400 days. In vivo chest counts during the first 6 months estimated lung burdens to be 10 to 30 nCi, but urinary excretion methods calculate residual systematic body burdens of 50 to 100 nCi at 1200 days after exposure. Current assumptions used in the in vivo calibration do not consider possible lung distribution of particulates soon after exposure that could alter the interpretation significantly. Tissue analysis of a lung from another case after recent inhalation exposure shows a significantly lesser concentration of plutonium in the subpleural region-the principal region of plutonium measurement by in vivo chest counting-as compared to distributions found years after exposure. Tissue analyses indicate that urinary excretion estimates of body burden over the long term tend to err on the high side up to a factor of 5 or more.
Author (ERA)

N76-26849# Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
**CANCER FOLLOWING MULTIPLE FLUOROSCOPIES**
H. B. Newcombe Aug. 1975 37 p Sponsored by ERDA
(AECL-5243) Avail: NTIS Avail: ERDA Depository Libraries HC $5.00; AECL $1.00

An epidemiological study for detecting carcinogenic effects of multiple fluoroscopies in Canadian tuberculosis patients, treated in the late 1930's to early 1950's, is described. Persons who received artificial pneumothorax treatment for tuberculosis, in the course of which they were fluoroscoped repeatedly, were studied. Roughly half of the patients with pulmonary tuberculosis, in that period, received artificial pneumothorax. That breast cancer has been caused in women by the fluoroscopies seems clear from the results of preliminary studies, but the data have a number of important limitations. These studies are not large enough to indicate differences in the risks from various numbers of fluoroscopies. Also, unless the numbers of years at risk in the irradiated and unirradiated groups can be shown to be similar, there is a possibility of bias affecting the comparison. In addition, information on the numbers of malignancies other than breast cancer, in patients of both sexes, would be of substantial importance even if no effect of the irradiations could be demonstrated.
Author (ERA)

N76-26850# Rochester Univ., N.Y. School of Medicine and Dentistry.
**RADIOBIOLOGIC EFFECTS AT LOW RADIATION LEVELS**
G. W. Casarett 1975 14 p refs Presented at the Intern. Symp. on Areas of High Natural Radioactivity, Pocos de Caldas, Brazil, 16-20 Jun. 1975 Sponsored by ERDA
(CONF-750671-2; UR-3490-832) Avail: NTIS HC $4.50

Data are reviewed on the effects of low radiation doses on mammals. Data from the 1972 report on the Biological Effects of Ionizing Radiation issued by the Advisory Committee of the National Academy of Sciences and National Research Council are discussed. It was concluded that there are certain radiosensitive systems in which low doses of radiation may cause degenerative effects, including gametogenic epithelium, lens of the eye, and developing embryos. Despite extensive investigation of genetic effects, including chromosomal effects, neither the amount of change that will be caused by very low levels of irradiation nor the degree of associated detriment is known.
ERA

N76-26851# Commissariat a l'Energie Atomique, Cadarache (France).
**RECOMMENDATIONS FOR CRITICALITY ACCIDENT DOSIMETRY**
Jul. 1975 75 p In FRENCH
(CEA-R-4669) Avail: ERDA Depository Libraries HC $5.00

The aims of criticality accident dosimetry and the characteristics peculiar to a critical burst are defined and the requirements to be fulfilled by a personnel dosimetric system that can be applied to this type of measurements are specified. The devices chosen are described along with the main processes to be carried out in order to evaluate doses after a radiation accident. The apparatus necessary for detector counting and the directions for use are presented in detail, allowing standardization of measurements. A set of linear formula enables to obtain, from these measurements, all wanted informations about neutron fluences and spectra, along with the suitable components of the dose at the locations of the irradiated people.
Author (NSA)

N76-26852# Veterans Administration Hospital, Hines, Ill.
**METABOLISM OF Sr-90 AND OF OTHER ELEMENTS IN MAN, JULY 1, 1974 - JUNE 30, 1975**
31 Dec. 1975 28 p Sponsored by ERDA
(Contract AT(11-1)-1231)
(COO-1231-104) Avail: NTIS HC $4.00

Trace element studies were carried out under strictly controlled dietary conditions in adult males during different calcium intakes. Complete metabolic balances of cadmium, copper, zinc, lead, manganese, and nickel were determined in each 6-day metabolic period by analyzing the constant diet and the urinary and fecal excretions of these naturally occurring elements. In addition to the trace element studies, Sr-85 studies were carried out in man in order to complete previously initiated investigations.
Author (NSA)

N76-26853# Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.
**ANTIDOTE EFFECTS OF ATROPINE, TOXOGONIN, SAD 128 AND ISOPRENALIN IN RATS POISONED WITH PARAOXON [ANTIDOT-EFFEKTE VON ATROPIN, TOXOGONIN (R), SAD 128 UND ISOPRENALIN AN DER PARAOXON-VERGIFTETEN RATTE]**
G. Oberdoerster Bonn DOKZENTBw 1975 29 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. der Verteidigung
(BMVg-FBWT-75-15) Avail: NTIS HC $4.00; DOKZENTBw DM 20

In comparison to atropine and toxogonin the antidotal effects of SAD 128 and isoprenaline were investigated in paraoxon-poisoned (0.25 and 0.5 mg/kg s.c.) female Wistar rats. Blood pressure, heart frequency, action potentials of the phrenic nerve and the diaphragm, inspiratory movement of the chest as well as lung ventilation were monitored continuously. Survival time after paraoxon poisoning was significantly increased after atropine (5 mg/kg i.v.) and toxogonin (30 mg/kg i.v.). SAD 128 (5 mg/kg i.v.) was able to normalize circulation, neuromuscular activity, and phrenic nerve activity of the paraoxon treated rats, but survival time was not significantly increased. Isoprenaline (10 micro g/kg/min i.v.) showed a positive influence on the paraoxon poisoning with an increase of the activity of phrenic nerve and diaphragm. Isoprenaline improved lung ventilation and cardiac and circulatory function due to its beta-adrenergic activity.
Author (ESA)

N76-26854# Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.
**PROTECTIVE EFFECT OF SOME PYRIDINIUM COMPOUNDS AGAINST THE INHIBITION OF STRUCTURE BOUND ACETYLCHOLINESTERASE BY SOMAN IN VITRO [SCHUTZWIRKUNG EINIGER AUSGEWAEHLTER PYRIDINIUMVERBINDUNGEN GEGEN DIE INHIBIERUNG VON STRUKTURGEBUNDENER ACETYLCHOLINESTERASE DURCH SOMAN IN VITRO]**
H. Kuhnen Bonn DOKZENTBw 1975 33 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. der Verteidigung
(BMVg-FBWT-75-16) Avail: NTIS HC $4.00; DOKZENTBw DM 30

The protective effect of pyridinium compounds against the acetylcholinesterase inhibition by Soman in vitro was investigated. The relative protective effects (RS-values) were calculated, and the RS-values of the protective effects against I50 DFP and I50 Soman were compared. The protective effect is due to the chemical structure of the parent compounds and can be enhanced or decreased by substituents. The effect is not necessarily related to the reactivating power of the pyridinium compound. Substances which are not reactivators may have a relatively good protective power, e.g. SAD 128, and P 141, with the tert.-butyl and pinacolyl groups as substituents. The mechanism of action of the protective substances was interpreted by occupation of a secondary bonding site in the vicinity of the active centre. Ligand bonding at this secondary site causes conformational changes of the enzyme. This allosteric mechanism may complicate the phosphorylation of the active site.

Author (ESA)

**N76-26855#** Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

**PHARMACOKINETICS OF THE SPASMOLYTIC ACTION OF SOME BISPYRIDINIUM COMPOUNDS ON THE MUSCLE STRIP OF THE GUINEA PIG ILEUM [PHARMAKOKINETIK DER SPASMOLYTISCHEN WIRKUNG EINIGER AUSGEWAEHLTER BISPYRIDINIUM-VERBINDUNGEN AUF MUSKELSTREIFEN DES MEERSCHWEINCHENILEUM]**

D. Kuhnen-Clausen Bonn DOKZENTBw 1975 46 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. der Verteidigung

(BMVg-FBWT-75-17) Avail: NTIS HC $4.00; DOKZENTBw DM 30

The antagonistic effects of some bispyridinium compounds on muscarinic and histaminic receptors were investigated on the isolated longitudinal muscle strip of the guinea pig ileum. The affinity of the derivatives is higher to muscarinic than to histaminic binding sites. A structure/activity relationship was established in both cases. Dose response curves of acetyl-beta-methylcholine were analyzed to evaluate the mechanism of drug receptor interactions on the molecular level. Protection experiments were carried out with the antagonists against the alkylation of muscarinic and histaminic receptors by dibenamine. Both receptor systems are allosteric, regulatory proteins. The theory of the receptor reserve, therefore, is contradicted. Author (ESA)

**N76-26856#** Whittaker Corp., Waltham, Mass. Space Sciences Div.

**DEVELOPMENT OF AN IMPLANTABLE OXYGEN SENSOR: IN VIVO VALIDATION AND REFINEMENT Annual Report, Jun. 1974 - Jun. 1975**

Kuo Wei Chang and Sol Aisenberg Jun. 1975 122 p refs (Contract NO1-HR-33003-R)

(PB-249333/6; SSD-P-708-AR-2) Avail: NTIS HC $5.50 CSCL 06B

Sensors for continuous measurement of oxygen tension in blood, tissue and endotracheal tubes are described. These sensors are fuel cells operating in the oxygen-diffusion-limited mode. The short circuit currents of these sensors are directly proportional to the oxygen tension of the surrounding medium. The basic principle of operation, sensor construction, and results of in vitro and in vivo studies are presented in great detail. Test results obtained to date show that these sensors are accurate, stable, fast responding and calibratible with only one PO2 measurement. GRA

**N76-26857#** Naval Submarine Medical Research Lab., Groton, Conn.

**BODY FLUID DISTRIBUTION IN ACUTE HYPERCAPNIA Interim Report**

R. D. Murray, F. T. Abbott, and K. E. Schaefer 16 Jun. 1975 14 p refs

(MR0410101)

(AD-A019922; NSMRL-814) Avail: NTIS CSCL 06/19

Guinea pigs and rats were exposed to 1.9, 6.9 and 10.8% CO2 for a period of one hour. Measurements of total body water (TBW), extracellular fluid (ECF) and intracellular fluid (ICF) were made using tritiated water and radioactive chloride (Cl36). Control values for TBW, ECF and ICF were 64.6, 28.5 and 36.1 for rats and 61.7, 30.6 and 31.1 for guinea pigs. These values did not change significantly under hypercapin. These results indicate that although no measurable changes occurred in body fluid distribution under hypercapnia, the differences in body water distribution between guinea pigs and rats may help explain species differences in response to hypercapnic stress.

Author (GRA)

**N76-26858#** Naval Submarine Medical Research Lab., Groton, Conn.

**COMPARISON OF BIOCHEMICAL RESPONSES BETWEEN SINGLE AND REPEATED EXPOSURES TO AIR AT 6.7 ATA Interim Report**

E. Heyder, M. J. Jacey, and D. V. Tappan 4 Jun. 1975 26 p refs

(MF51524014)

(AD-A020044; NSMRL-810) Avail: NTIS CSCL 06/19

U.S. Navy diver volunteers were subjected to short (45-minute) exposures to air at 6.7 ATA. The experimental protocol was designed to compare the recoveries from single exposures with those from similar dives employing 3-day inter-dive intervals. Serum and 24-hour urine samples were collected for 5 days prior to and for 7 and 10 respectively after the dives. Serum and urinary minerals, electrolytes, and protein metabolites as well as serum enzymes and urinary steroids were measured. The overall effects of air at 6.7 ATA and 19 serum parameters was very pronounced 1 hour post-dive. Following a single dive, the response declined sharply to a low after 3 days. This was followed by a second response peak after 5 days and a subsequent gradual decline. Following the 3-day-repeat dives, a secondary peak occurred on the 3rd day following the second dive. The response to the diving stress as indicated by 14 urine parameters showed a small increase on the first two post-dive days followed by a decrease on the third. After a single dive, the consequences of the exposure continued to increase for up to 7-8 days. When a second dive was made on the 3rd day after the initial exposure, a very large response occurred on the 2nd day after the second dive, with a rebound on the 3rd day, and secondary peaks on the 4th and 6th day. These studies support previous observations that effects of hyperbaric exposure continue for several days following pressurization. Repeated exposures within the recovery period alter the pattern of recovery.

Author (GRA)

**N76-26859#** Flying Personnel Research Committee, London (England).

**THE RETENTION OF PROTECTIVE ADAPTATION TO MOTION SICKNESS INDUCED BY CROSS-COUPLED ANGULAR ACCELERATIONS**

J. T. Reason and E. Diaz Feb. 1975 26 p refs

(AD-A019294; FPRC-1335) Avail: NTIS CSCL 06/19

Two experiments are reported. In the first, designed to assess the retention of adaptation to repeated exposures of graded cross-coupled angular accelerations, eight young men received eight adaptation sessions in alternate directions of rotation over a total period of 24 weeks. The results indicated a steady build-up of 'savings' of protective adaptation as reflected by the progressive reduction in stimulation required to achieve an operationally-defined level of adaptation. The second experiment examined the relationship between the 'savings' of adaptation on the second of two exposures and the time interval between them. Twenty-five young men were assigned to five equal groups matched for motion sickness history. No decline in savings was observed with increasing time intervals. Finally, an attempt was made to integrate the findings of these two experiments into a general theoretical statement concerning the decay of protective adaptation following both single and repeated exposures to an adapting stimulus. GRA

**N76-26860#** Flying Personnel Research Committee, London (England).

**CATECHOLAMINE, CORTICOSTEROID AND KETONE**

**EXCRETION IN EXERCISE AND HYPOXIA**
P. Smith, R. F. Coward, and C. J. Hall May 1975 19 p refs
(AD-A019293; FPRC-Memo-256) Avail: NTIS CSCL 06/19

Four subjects undertook light exercise each working day for two consecutive weeks, during one of which the experiment was carried out under hypoxic conditions. The excretions of adrenaline, noradrenaline and 17-hydroxycorticosteroids (17-OHCS) were measured during the stress and also overnight, and urines were tested for the presence of ketone bodies. The excretion of adrenaline and 17-OHCS in stress was highest on the first day of each week. In general, the excretion of adrenaline was higher throughout the first, as compared with the second, week. These results are considered to be indicative of adaptation to stress. Only noradrenaline showed significantly higher excretion in hypoxia. Throughout the experiment excretion of 17-OHCS during the stress period was below normal levels, suggesting 'retention' of steroids in stress rather than increased adrenocortical activity. However, 17-OHCS excretion tended to be higher during the experimental period and subsequently lower overnight during the hypoxia week. Ketosis occurred in two subjects. In one of these it could be readily related to previous extraneous stress. Excretion of unidentified ketones in overnight urines was sometimes suspected and occurred beyond doubt following gross ketosis. Author (GRA)

**N76-26861#** Army Research Inst. of Environmental Medicine, Natick, Mass.
**METABOLIC ENERGY EXPENDITURE AND TERRAIN COEFFICIENTS FOR WALKING ON SNOW**
K. B. Pandolf, M. F. Haisman, and R. F. Goldman Jul. 1975 26 p refs
(DA Proj. 3A7-62758-A-827)
(AD-A019590; USARIEM-M-1-76) Avail: NTIS CSCL 06/19

The ten male subjects each walked at two speeds, 0.67 and 1.12 m/s (1.5 and 2.5 mph) on a level treadmill, and on a variety of snow depths. Energy expenditure increased linearly with increasing depth of footprint depression and was expressed, considering clothed weight, by the regression equation: energy expenditure (W/kg-hor km/hr) = 1.18 + 0.089 depression (cm). At 45 cm footprint depression as compared to a 0 cm depression, energy expenditure increased by a ratio of approximately 5:1. For 0.67 and 1.12 m/s, predicted metabolic rate (M) in watt (W) corresponded to the regression equations, M = 213.56 + 21.480 depression (cm), and M = 484.62 + 20.617 depression (cm), respectively. Although subjects were considered above average in terms of fitness (average vol max = 51.4 ml/kg-min (n = 6)), all terminated walking due to exhaustion at an average footprint depth of 35.0 cm at a walking speed of 1.12 m/s. Practical limits for prolonged snow walking not exceeding approximately 50% vol max were developed with 20 cm being the maximal depth at 0.67 m/s, and 10 cm at 1.12 m/s without snow shoes. At increased footprint depths, limiting factors for snow walking were the increasing lift work, inefficient stooping posture and balancing difficulty. GRA

**N76-26862** New Mexico State Univ., University Park.
**VISUAL TARGET ACQUISITION AND SEARCH PERFORMANCE Ph.D. Thesis**
John Buford Mocharnuk 1976 148 p
Avail: Univ. Microfilms Order No. 76-12638

The effects of information and physical variables on visual search performance and on the ocular activity associated with that performance, are studied. Three experiments were completed using a brief exposure technique. The manipulated variables included memory load, exposure duration, and the physical grouping of information within a display. Several patterns emerged from the data. Stimulus information appeared to have no effect on eye movement measures. Instead, the physical restrictions imposed on the search task were responsible for changes in ocular behavior. However, there was a substantial effect of information on total search performance. The per item search rate increased as the total information in the display increased. This informational effect was interpreted in terms of a variable processing rate hypothesis. Dissert. Abstr.

**N76-26863#** National Aviation Facilities Experimental Center, Atlantic City, N.J.
**DEVELOPMENT OF A PERFORMANCE CRITERION FOR ENROUTE AIR TRAFFIC CONTROL PERSONNEL RESEARCH THROUGH AIR TRAFFIC CONTROL SIMULATION: EXPERIMENT 1: PARALLEL FORM Interim Report, Jan. 1975 - Feb. 1975**
Edward P. Buckley, Bernard Goldberg, Richard Rood, Helen Hamilton, Florence Champion, James Talotta, R. Algeo, S. R. Pszczolkowski, Gerard Spanier, Francis Baldwin et al Feb. 1976 40 p refs
(FAA-RD-75-186; FAA-NA-75-40) Avail: NTIS HC $4.00 CSCL 05/9

Small experiments were performed as part of the process of developing a standardized performance criterion for journeyman enroute traffic controllers for the evaluation of potential aptitude tests as to their capacity to predict suitability for entrance into training. The purpose of these first experiments was to seek directions for the construction of different but equally difficult (parallel) forms of the test by using combinations of sector geographic structures and traffic density levels. Two sectors, which differed widely in geographic structure, and three traffic density levels were orthogonally combined to yield six experimental conditions. Six experienced air traffic controllers worked under each of the six conditions in the air traffic control simulator. The results indicate that performance scores were much less affected by sector structure than by traffic density. Consequently, it was accepted as a guideline for further work that parallel forms can be built on the basis of traffic density level equivalence alone. Author

**N76-26864#** Franklin McLean Memorial Research Inst., Chicago, Ill.
**PROGRESS IN EVALUATION OF HUMAN OBSERVER VISUAL DETECTION PERFORMANCE USING THE ROC CURVE APPROACH**
C. E. Metz, S. J. Starr, L. B. Lusted, and K. Rossmann 1975 9 p refs Presented at the 4th Intern. Conf. on Inform. Process. in Scintigraphy, Orsay, France, 15-19 Jul. 1975 Sponsored by ERDA
(CONF-750750-1) Avail: NTIS HC $4.50

Human observer performance in complex detection situations was analyzed. The results of these and similar studies will hopefully contribute toward development of an understanding of the relationships between physical image parameters and human observer decision performance in clinically relevant visual detection tasks. Efforts to develop an objective approach to evaluating the usefulness of diagnostic decisions which have been made on the basis of visual information are described. Applications in the interpretation of radiographs and radionuclide scans are discussed. ERA

**N76-26865*#** Scientific Translation Service, Santa Barbara, Calif.
**WATER FOR THE COSMONAUT**
Yu. Ye. Sinyak and S. V. Chizhov Washington NASA Jun. 1976 11 p Transl. into ENGLISH from Khim. Zhizn (USSR), no. 7, Jul. 1975 p 23-26
(Contract NASw-2791)
(NASA-TT-F-15480) Avail: NTIS HC $3.50 CSCL 06K

The problem of water supply for cosmonauts during long-duration space flight is reviewed. After it is shown that water constitutes the major weight in life support systems, natural water regeneration processes are discussed. Soviet and U.S. experiments with water regeneration systems are reviewed and the Salyut-4 regeneration system, which fulfilled one-half of the cosmonaut's drinking needs, is described. Author

**N76-26866*#** Scientific Translation Service, Santa Barbara, Calif.
**LIFE SUPPORT SYSTEMS AND RESEARCH APPARATUS FOR PERFORMING THE KOSMOS-782 SATELLITE EXPERIMENT**
B. A. Adamovich, A. A. Zlatorunskiy, A. D. Noskin, V. S. Poleshchuk, V. I. Milyavskiy, V. K. Golov, and V. K. Ovcharov Washington NASA Jun. 1976 7 p Transl. into ENGLISH

from an unpublished Russian report
(Contract NASw-2791)
(NASA-TT-F-15491) Avail: NTIS HC $3.50 CSCL 06K

A description is given of the equipment used on the Kosmos-782 satellite. Analysis of the data from the satellite showed that all systems operated normally. Author

**N76-26867*#** Scientific Translation Service, Santa Barbara, Calif.
**THE PRESERVATION OF COOKED DRIED RICE IN THE ALPHA-STATE BY FREEZE-DRYING**
J. H. Pyeun, Y. R. Choi, and C. E. Choi Washington NASA Jun. 1976 11 p refs Transl. into ENGLISH of "Dong-kiul-konjo-ae Eui-han Mipan-ae alpha-Hwoa-ae Kwan-ha-ya" The Army Research Report, v. 5, 1966 p 1-4
(Contract NASw-2791)
(NASA-TT-F-17063) Avail: NTIS HC $3.50 CSCL 06H

The effect of freeze-drying on the preservation of cooked and dried rice is examined as the improved means of emergency main food for the army. Temperature, condition of vacuum degree, and drying velocity in freeze-drying process are among the factors considered. Author

**N76-26868*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**REGENERABLE DEVICE FOR SCRUBBING BREATHABLE AIR OF CO2 AND MOISTURE WITHOUT SPECIAL HEAT EXCHANGER EQUIPMENT Patent Application**
Edward H. Tepper, inventor (to NASA) (Hamilton Standard, Windsor Locks, Conn.) Filed 21 May 1976 17 p Sponsored by NASA
(NASA-Case-MSC-14770-1; US-Patent-Appl-SN-688855) Avail: NTIS HC $3.50 CSCL 06K

A device is described which absorbs and adsorbs carbon dioxide and excess moisture in cabin atmospheres. The sorbing material is a polyethyleneimine coating which absorbs and adsorbs impurities at standard temperatures and pressures, but desorbs such impurities at low pressures and standard temperatures. The device is made in a stack of cells consisting of identical layers which are isolated flow-wise and are connected to separate manifolds and valving systems into two separate subsets. One subset scrubs the air until the polyethyleneimine is saturated while the other subset purifies the saturated polyethyleneimine. Since sorption processes liberate heat while the desorption processes require heat, the device also operates a heat exchanger. Aluminum is used to separate the cells from one another and is disposed throughout the polyethyleneimine to assist in the heat transfer. The metal is formed into fins and conducts exothermic energy so well from a sorbing cell to its desorbing neighbors that the cells operate essentially isothermally, maintaining a constant mean average temperature and requiring neither the addition nor the removal of heat from the cabin air. NASA

**N76-26869*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**REGENERABLE DEVICE FOR SCRUBBING BREATHABLE AIR OF CO2 AND MOISTURE WITHOUT SPECIAL HEAT EXCHANGER EQUIPMENT Patent Application**
Edward H. Tepper, inventor (to NASA) (Hamilton Standard, Windsor Lock, Conn.) Filed 21 May 1976 20 p Sponsored by NASA
(NASA-Case-MSC-14771-1; US-Patent-Appl-SN-688854) Avail: NTIS HC $3.50 CSCL 06K

A device is described which absorbs and adsorbs carbon dioxide and excess moisture in cabin atmospheres. The sorbing material is a polyethyleneimine coating which absorbs and adsorbs impurities at standard temperatures and pressures, but desorbs such impurities at low pressures and standard temperatures. The device is made in a stack of cells consisting of identical layers which are isolated flow-wise and are connected to separate manifolds and valving systems into two separate subsets. One subset scrubs the air until the polyethyleneimine is saturated while the other subset purifies the saturated polyethyleneimine. Since sorption processes liberate heat while the desorption processes require heat, the device also operates a heat exchanger. Foamed aluminum is used to separate the cells from one another and is disposed throughout the polyethyleneimine to assist in the heat transfer. The foamed metal is formed into blocks and conducts exothermic energy so well from a sorbing cell to its desorbing neighbors that the cells operate essentially isothermally, maintaining a constant mean average temperature and requiring neither the addition nor the removal of heat from the stream of cabin air. NASA

**N76-26870#** Royal Aircraft Establishment, Farnborough (England).
**FUNCTIONAL TWO-DIMENSIONAL MANIKINS**
H. W. Jeurgens, K. Helbig, and T. Kopka Mar. 1976 13 p refs Transl. into ENGLISH from Ergonomics (London), v. 18, no. 2, 1975 p 185-194 (Original in German)
(RAE-Lib-Trans-1859; BR52161) Avail: NTIS HC $3.50

Two-dimensional manikins are used as tools in designing and assessing workplaces (on a 1:1 scale) in the broadest sense. Models available to date reduce the joints of the human body to fixed axial joints and are therefore incapable of reproducing changes in the shape of the body resulting from movement. A new type of joint in the 'Kieler Puppe' model introduced here for a seated and standing person in profile, and a seated person as seen from above, permits only physiological body postures and reproduces natural body contours in every posture and every postural change. Author

**N76-26871*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
**AN ARTIFICIAL LEG EMPLOYING A MECHANICAL ENERGY STORAGE DEVICE FOR HIP DISARTICULATION Patent Application**
Wilbur C. Vallotton, inventor (to NASA) Filed 30 Jun. 1976 14 p
(NASA-Case-ARC-10916-1; US-Patent-Appl-SN-701448) Avail: NTIS HC $3.50 CSCL 06B

An artificial leg which includes a trunk socket, a thigh section hingedly coupled to the trunk socket, a leg section hingedly coupled to the thigh section, and a foot section hingedly coupled to the leg section is described. Energy is stored in a mechanical energy storage device during a weight-bearing phase of the walking stride when the user's weight is on the artificial leg, and energy is released during a phase of the normal walking stride, when the user's weight is removed from the artificial leg. The stored energy is released from the energy storage device to pivot the thigh section forwardly about the hinged coupling thereof to the trunk socket. A dash-pot is coupled between the lower end of the thigh section and the foot section for damping flexing of the knee joint after a certain predetermined extent of ankle flexing is achieved to derive a more normal stride and cadence. NASA

**N76-26872#** European Space Agency, Paris (France).
**SAFETY ANALYSIS OF MANNED SYSTEMS**
R. C. Kohlheyer 1976 9 p Presented at the European Space Prod. Assurance Symp., Frascati, Italy, 4-6 May 1976
Avail: NTIS HC $3.50

Human safety aspects are considered within the context of manned space flight, in particular Spacelab. The complexity of safety tasks is illustrated, and the contention is underlined that application of simple rules and procedures to the exclusion of reason and experience is perhaps more hazardous in the false confidence they give than in the failures they prevent. ESA

**N76-26873#** Army Aeromedical Research Lab., Fort Rucker, Ala.
**BIO-OPTICAL EVALUATION OF SPECIALIZED EYEWEAR: LASER SAFETY AND DARK ADAPTATION DEVICES Final Report**
Wun C. Chiou and David D. Glick Nov. 1975 31 p refs
(AD-A019787; USAARL-76-7) Avail: NTIS CSCL 17/8

This report provides quantitative data and color vision evaluations for several types of goggles. The first two types are laser safety devices and the other three are for dark adaptation purposes. It is found that He-Ne laser safety eyewear conforms to the Army Regulation specification. It is recommended that

one type of the safety device be used for only one specific purpose. Furthermore, the laser safety device cannot be used when a detection of a red display or a red light source is required. Results from the dark adaptation devices show that the spectral transmission characteristics possess virtually a common distribution. Author (GRA)

N76-26874*+ National Aeronautics and Space Administration, Washington, D.C.
**PUBLICATIONS OF THE PLANETARY BIOLOGY PROGRAM FOR 1975: A SPECIAL BIBLIOGRAPHY**
K. A. Souza, comp. and R. S. Young, comp. Jul. 1976 24 p
(NASA-TM-X-74313) Avail: NTIS HC $3.50 CSCL 06C

The Planetary Biology Program of the National Aeronautics and Space Administration is the first and only integrated program to methodically investigate the planetary events which may have been responsible for, or related to, the origin, evolution, and distribution of life in the universe. Research supported by this program is divided into the seven areas listed below: (1) chemical evolution, (2) organic geochemistry, (3) life detection, (4) biological adaptation, (5) bioinstrumentation, (6) planetary environments, and (7) origin of life. The arrangement of references in this bibliography follows the division of research described above. Articles are listed alphabetically by author under the research area with which they are most closely related. Only those publications which resulted from research supported by the Planetary Biology Program and which bear a 1975 publication date have been included. Abstracts and theses are not included because of the preliminary and abbreviated nature of the former and the frequent difficulty of obtaining the latter. Author

N76-27812*# Boeing Co., Houston, Tex.
**LIFE SCIENCES PAYLOADS ANALYSES AND TECHNICAL PROGRAM PLANNING STUDIES Final Report, 1 Jul. 1973 - 30 Apr. 1976**
Apr. 1976 55 p refs
(Contract NAS9-13655)
(NASA-CR-147799) Avail: NTIS HC $4.50 CSCL 22A

Contractural requirements, project planning, equipment specifications, and technical data for space shuttle biological experiment payloads are presented. Topics discussed are: (1) urine collection and processing on the space shuttle, (2) space processing of biochemical and biomedical materials, (3) mission simulations, and (4) biomedical equipment. J.R.T.

N76-27813*# Scientific Translation Service, Santa Barbara, Calif.
**PRELIMINARY RESULTS OF STUDIES ON THE BIOSATELLITE KOSMOS-782**
O. G. Gazenko, R. G. Butenko, B. A. Rubin, and L. V. Belousov Washington NASA Jun. 1976 151 p refs Transl. into ENGLISH of "Predvaritelnyye Rezultaty Issledovaniy na Biosputnike Kosmos-782" Moscow Inst. of Med. Biol. Probl. of USSR Min. of Public Health, USSR Acad. of Sci. 1976 p 1-125
(Contract NASw-2791)
(NASA-TT-F-15500) Avail: NTIS HC $6.75 CSCL 06A

A description is given of the results of experiments on Kosmos-782. The results of all four biological experiments conducted in the joint Soviet-American program are discussed. Positive results were obtained in all of the tests. Author

N76-27814*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Statistics.
**STATISTICAL SUPPORT FOR THE ATL PROGRAM Final Report, 1 Jul. 1974 - 15 Jun. 1976**
K. Hinkelmann and R. H. Myers 15 Jun. 1976 21 p
(Grant NsG-1071)
(NASA-CR-148311) Avail: NTIS HC $3.50 CSCL 06M

Statistical experimental designs are presented for various numbers of organisms and agar solutions pertinent to the experiment, "colony growth in zero gravity". Missions lasting 7 and 30 days are considered. For the designs listed, the statistical analysis of the observations obtained on the space shuttle are outlined. Author

N76-27815*# California Inst. of Tech., Pasadena. Div. of Biology.
**GEOCHEMISTRY OF BIOMOLECULES Final Report, 1 Jul. 1973 - 30 Jun. 1975**
James Bonner 12 Jul. 1976 15 p refs
(Grant NGR-05-002-310)
(NASA-CR-148327) Avail: NTIS HC $3.50 CSCL 06M

A highly sensitive fluorometric technique is developed for the determination of biological and geo-organic compounds in ancient sediments and extraterrestrial samples. This technique is used to establish chemical evidence for fossil pigments in an extraterrestrial sample. Also developed is a highly sensitive and specific fluorometric method for the determination of total primary amine nitrogen in soil samples. Author

N76-27816*# Alcorn State Univ., Lorman, Miss. Dept. of Biological Sciences.
**BIODEGRADATION OF ROCKET PROPELLANT WASTE, AMMONIUM PERCHLORATE Final Report**
Syed M. Z. Naqvi and Abdul Latif 3 Jul. 1975 40 p
(Grant NsG-8005)
(NASA-CR-148323) Avail: NTIS HC $4.00 CSCL 06C

The short term effects of ammonium perchlorate on selected organisms were studied. A long term experiment was also designed to assess the changes incurred by ammonium perchlorate on the nitrogen and chloride contents of soil within a period of 3 years. In addition, an attempt was made to produce methane gas from anaerobic fermentation of the aquatic weed, Alternanthera philoxeroides. Author

N76-27817# Electrotechnical Lab., Tokyo (Japan).
**THE MECHANISM OF ANIMAL COLOR VISION**
Mitsuo Tonoike, Masamine Takebayashi, and Yutaka Kurioka Jan. 1976 100 p refs In JAPANESE; ENGLISH summary
(Rept-186) Avail: NTIS HC $5.00

A survey of animal color vision from two viewpoints, electrophysiological and behavioral is described. Color vision mechanisms of both invertebrates and vertebrates are introduced, and results on specific animals are summarized. Similarities of the Macaque monkey to human beings in color vision, and physiological results in the visual pathway from the retina to the visual cortex are described. These results give useful information on the visual pathway in the study of human color vision. B.B.

N76-27818# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.
**ONTOGENETIC DEVELOPMENT OF ARTEMIA SALINA IN LOW AND HIGH PRESSURES Ph.D. Thesis - Bonn Univ.**
Renate Peters 15 Mar. 1976 44 p refs In GERMAN; ENGLISH summary Report will also be announced as translation
(DLR-FB-76-19) Avail: NTIS HC $4.00; DFVLR, Cologne DM 18.70

The influence of different atmospheric pressures on the development of the eggs of Artemia salina was investigated. In a total of 65 experiments the animals were bred up to the stage of the first nauplius in low and high pressures as well as under normal atmospheric conditions. It was found that the space of time needed for full development was constant throughout, whereas the time of incubation, i.e. the interval between the beginning of each experiment and the moment of microscopically perceptible hatching was reduced. Factors which affected the results of the experiments are accounted for. Author (ESA)

N76-27819# Advisory Group for Aerospace Research and Development, Paris (France).
**THE ROLE OF THE CLINICAL LABORATORY IN AEROSPACE MEDICINE**
Raymond G. Troxler, ed. (School of Aerospace Med.) May 1976 127 p refs Presented at the Aerospace Med. Panel Specialists Meeting, Ankara, Turkey, 23 Oct. 1975
(AGARD-CP-180; ISBN-92-835-0165-9) Copyright. Avail: NTIS HC $6.00

Papers are presented which consider laboratory screening

of aircraft pilots and crews. Specific topics discussed include: early detection of disease; assessment of stress in air traffic controllers and pilots; and selection of pilots based on results of physical examinations.

**N76-27820** New York State Univ., Syracuse. Dept. of Pathology.
**THE LABORATORY ROLE IN EARLY DETECTION OF DISEASE**
John Bernard Henry *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 5 p refs

Copyright.

Utilization of laboratory measurements and examinations in the early detection of disease is discussed. The complex interrelations of sensitivity, specificity, and incidence and the predictive value of positive results are emphasized. J.M.S.

**N76-27821** Viale Univ., Rome (Italy).
**LABORATORY EMPLOYMENT IN AEROSPACE MEDICINE**
G. Paolucci *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 2 p refs

Copyright.

Laboratory applications in aerospace medicine are summarized. These include: (1) determination of the emo-biochemical state in normal or pathological conditions; (2) detection of emotional changes in flight; (3) evaluation of tissue damage in traumatized persons; and (4) applications to aviation casualties. Urinary catechelamine determination and measurement of activity of some serum enzymes are among the techniques discussed. J.M.S.

**N76-27822** School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
**COMMON PROBLEMS ENCOUNTERED IN LABORATORY SCREENING OF USAF FLIGHT CREWS FOR LATENT CORONARY ARTERY DISEASE**
R. G. Troxler *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 11 p refs

Copyright.

Laboratory screening to identify men at increased risk for coronary artery disease is discussed. Annual determination of cholesterol and triglyceride levels, monitoring of accuracy and precision by in-house and external quality control, and effects of biological variability are among the factors included. Data are presented showing that separation of diseased from nondiseased population improves with increased laboratory precision. A normal range based on percentiles for 925 USAF male flyers without detectable coronary artery disease is also presented. The limitations of this method of normal ranges are discussed. Author

**N76-27823** Institute of Aviation Medicine, Fuerstenfeldbruck (West Germany).
**EPIDEMIOLOGICAL STUDIES OF SUBCLINICAL DIABETES MELLITUS**
K. Reichenbach-Klinke *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 4 p refs

The incidence of asymptomatic, subclinical, or chemical diabetes in pilots and pilot applicants is studied. A coincidence of other biochemical data: of liver and risk factors of coronary disease with regard to hypertension, obesity, and ECG is also examined. Methods used and results are briefly discussed.J.M.S.

**N76-27824** Marburg Univ. (West Germany).
**RADIOIMMUNOASSAYS: NEW LABORATORY METHODS IN CLINIC AND RESEARCH**
E. H. Craul and H. Mueller *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 9 p refs
Copyright.

Radioimmunoassays (RIA's) which permit quantitative determination for serum components, especially hormones and immunoglobulins, such as IgE, in very slight concentrations as well as pharmaceuticals, such as digitalis are considered. The RIA's are based on the antigen-antibody reaction, in which the substance to be measured and the corresponding radicactively labelled substance compete for binding sites on the specific antibody. Interpretation of the measurement results and further development are discussed. Author

**N76-27825** School of Aerospace Medicine, Brooks AFB, Tex. Epidemiology Div.
**THE ROLE AND LIMITATIONS OF RADIOIMMUNOASSAY AS A LABORATORY DIAGNOSTIC PROCEDURE**
Robert L. Buchenauer *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 5 p refs

Copyright.

The basic concepts of radioimmunoassay (RIA) and competitive protein binding (CPB) are reviewed. The characteristic features of sensitivity and specificity are discussed as they relate to the problems and limitations of test variability and biological interference in the performance of radioassays in the clinical laboratory. Potential problems due to improper patient preparation and specimen collection and handling are mentioned. A survey is presented of selected biological compounds that can currently be measured by radioimmunoassay and related techniques. Author

**N76-27826** Laboratoire de Medecine Aerospatiale, Bretigny-sur-Orge (France).
**APPLICATION OF FLIGHT STRESS SIMULATION TECHNIQUES FOR THE MEDICAL EVALUATION OF AIRCREW PERSONNEL [POSSIBILITE DE L'UTILISATION DES MOYENS DE SIMULATION DES AGRESSIONS AERONAUTIQUES POUR L'EXPERTISE MEDICALE DU PERSONNEL NAVIGANT]**
J. Demange, R. Auffret, B. Vettes, and J. L. Poirier *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 7 p refs In FRENCH

The role that may be played by an aerospace medicine laboratory, well equipped with simulation tools such as centrifuges, vibration generators, etc. and measuring tests such as physiologic and psychophysiologic examinations, in the more difficult medical evaluation of aircrew personnel, was described. This is based on the logic that, in borderline cases, a final decision on the medical fitness of pilots for flight status should only be reached after completion of tests that simulate, as realistically as possible, the stresses actually encountered in flight. In addition, such a laboratory is able, by repeating such tests, to objectively obtain longitudinal data on a pilot, to study transient favorable or unfavorable changes, and to observe the long-term effects of aging. Transl. by Y.J.A.

**N76-27827** Army Aeromedical Research Lab., Fort Rucker, Ala.
**AVIATOR PERFORMANCE: BIOMEDICAL, PHYSIOLOGICAL, AND PSYCHOLOGICAL ASSESSMENT OF PILOTS DURING EXTENDED HELICOPTER FLIGHT**
Kent A. Kimball and David B. Anderson *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 15 p refs

Copyright.

The physiological, psychological, and performance effects of extended helicopter flight are investigated. Measurements of biochemical, physiological, and psychological parameters were obtained and compared with inflight performance measures obtained by the USAARL Helicopter Inflight Monitoring System. Six rotary wing aviators performed extended daily flight missions for a period of five days. In addition, when not flying, various psychological tests were administered. Physiological and biochemical monitoring were conducted throughout the five day period. The aviators were on a controlled diet and slept approximately three hours each night. Preliminary findings are presented in relation to performance, biochemical, physiological, and psychological parameters. Author

N76-27828 Civil Aeromedical Inst., Oklahoma City, Okla. Aviation Physiology Lab.

**STUDIES ON STRESS IN AVIATION PERSONNEL, ANALYSIS AND PRESENTATION OF DATA DERIVED FROM A BATTERY OF MEASUREMENTS**

C. E. Melton, J. M. McKenzie, J. T. Saldiver, and Marlene Hoffmann *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 6 p refs

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Determination of stress in aircraft pilots and air traffic controllers is considered. The complexity of the data derived from batteries of measurements of stress is discussed. A method is described in which data related to stress indicators are weighted so that their importance is equivalent. The weighted value are integrated to yield an index, C sub s, which allows a comparative overview of stress in air traffic control facilities. Data so normalized can be presented in graphic form without oversimplification. The method increases the usefulness of stress studies to managers. Author

N76-27829 Army Research Inst. of Environmental Medicine, Natick, Mass.

**THE FIELD ARTILLERY FIRE DIRECTION CENTER AS A LABORATORY AND FIELD STRESS-PERFORMANCE. MODEL 1: POSITION PAPER. 2: PROGRESS TOWARDS AN EXPERIMENTAL MODEL**

J. W. Stokes, L. E. Banderet, R. P. Francesconi, A. Cymerman, and J. B. Sampson *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 10 p refs

Copyright.

The 5-man fire direction center (FDC), common to all Field Artillery batteries, was chosen for study in the laboratory and field to evaluate the impact of environmental and situational stress on the complex performance of highly trained and motivated individuals working together as a team. The working environment of a field FDC was simulated within a hypobaric chamber and a volunteer FDC team from an elite U.S. Army unit was tested using realistic matched combat scenarios. To minimize practice effects, the team was initially given 26 hours of intensified training (ITS). The team was then tested blinded as to the altitude condition for 48 hours at both a control altitude and high altitude; the team rested 22 hours between ITS and control and 48 hours between control and the high altitude conditions. Mission performance during ITS and control was sensitive to disrupted sleep-rest cycles, with errors clustering at times of low arousal. At high altitude, performance was less efficient during the first 10 hours; most serious errors involved processing of digits. Over learned FDC skills showed little deterioration even when the men were ill with acute moutain sickness. Compensatory behaviors were evident and technical performance for the last 38 hours at high altitude equalled or exceeded control. Thus communications, psychomotor, and judgement aspects of FDC performance, as well as measures of symptoms, mood, and neuroendocrine response, appear differentially sensitive to psychological stress, hypoxia, and fatigue. Author

N76-27830 Institute of Aviation Medicine, Fuerstenfeldbruck (West Germany).

**EXPERIENCE WITH ELECTROENCEPHALOGRAPHY IN APPLICANTS FOR FLYING TRAINING 1971 AND 1972**

H. Oberhole *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 6 p refs

Copyright.

Standard criteria for defining abnormal tracings in electroencephalography are summarized. These criteria are evaluated in relation to flying fitness examinations. J.M.S.

N76-27831 Centro di Studi e Ricerche di Medicina Aeronautica e Spaziale, Rome (Italy).

**BEHAVIOR OF SOME RESPIRATORY PARAMETERS IN CANDIDATE PILOTS. A COMPARATIVE STUDY BETWEEN TWO DIFFERENT GROUPS EXAMINED AT TEN YEARS INTERVAL**

C. A. Ramacci and G. Meineri *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 7 p refs

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The hypothesis that static respiratory values could undergo a change in the course of time, in the same age groups was studied. A comparison was carried out between two groups of candidate military pilots. The respiratory parameters taken into consideration were: vital capacity and time vital capacity. The results show that no significant change took place. It is still deemed advisable to perform periodic checks. The existence of other elements that could exert a certain influence on the parameters studied was established. Author

N76-27832 Italian Air Force Medical Service H. Q., Rome.

**SURVEY ON MEDICAL REQUIREMENTS AND EXAMINATION PROCEDURES FOR THE PREVENTION OF TRAUMATIC AND NON-TRAUMATIC OSTEOARTHROPATHIES DUE TO FLYING ACTIVITIES**

Gaetano Rotondo *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 6 p refs

Copyright.

The criteria, the medical requirements, and the examination procedures employed during the selection of pilots are examined in terms of the osteoarticular system and the spine. The conditions facilitating the occurance of osteo-arthropathies during high speed flight are emphasized. Author

N76-27833 Centro di Studi e Ricerche di Medicina Aeronautica e Spaziale, Rome (Italy).

**CONTROL OF HEMOSTATIC DISORDERS IN AIR FORCE PERSONNEL**

G. Blundo and G. Paolucci *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 2 p refs

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A general examination was carried out to establish the risk from possible hemostatic disorders, due to diseases, drugs or toxic industrial products, of subjects occupationally exposed to traumatisms. The hemostatic process was examined by studying partial thromboplastin time, prothrombin time, thromboelastographic record, platelet count, and individual anamnesis. The data obtained are discussed with respect to frequencies of hemostatic disorders found, and the utility of laboratory control in medical examination. Author

N76-27834 Service de Sante pour l'Armee de l'Air, Paris (France).

**INVESTIGATIONS OF THE BLOOD VESSELS ELASTIC EXPANSION, HEART OUTPUT, AND HEART RHYTHM, BASED ON THE MEASUREMENT OF VARIATIONS IN THE THORACIC ELECTRIC IMPEDANCE [EVALUATION DE LA DISTENSIBILITE VASCULAIRE DU DEBIT CARDIAQUE, ET DE LA CHRONOLOGIE CARDIAQUE, PAR LA MEASURE DES VARIATIONS D'IMPEDANCE ELECTRIQUE THORACIQUE]**

J. Colin, J. Demange, and J. Langlois *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 12 p refs In FRENCH

Copyright.

Changes in the electric impedance measured with electrodes on the anterior portion of the thorax, near the descending aorta, were found to be proportional to the volumetric changes of the thoracic vessels in that region. Investigations of the effect of age on the data obtained with 91 healthy subjects disclosed that the change in the electric impedance are partly caused by changes in the elasticity of the blood vessels. The experimental data was also used to study the systolic volume and heart output. Calibration was obtained using 120 simultaneous measurements with the dilution method and electric impedance data on cardiac subjects. The results obtained with healthy subjects are in good agreement with those previously obtained using Fick's method, especially in regards to the effects of age and position. On the other hand, the mediocre correlation between the dilution and electric impedance methods with cardiac subjects makes this approach presently impractical clinically. Transl. by Y.J.A.

**N76-27835** Amsterdam Univ. (Netherlands).
**THE INFLUENCE OF ALCOHOL ON SOME VESTIBULAR TESTS**
A. J. Greven, W. J. Oosterveld, and Wilhelmina Gasthuis *In* AGARD The Role of the Clin. Lab. in Aerospace Med. May 1976 6 p
Copyright.

In human subjects the influence of an alcoholic beverage on some vestibular tests was examined; 48 experiments were conducted in 27 normal humans, 15 men and 12 women. The effect of alcohol was observed upon fixation nystagmus, gaze nystagmus, the visual tracking pendulum test, and the optokinetic induced nystagmus. Alcohol was given in four different quantities: 0.1, 0.2, 0.4 and 0.8 g/kg body weight, as whiskey (34%). With each dosage 12 experiments were performed in 12 subjects (6 men and 6 women). Author

**N76-27836** Advisory Group for Aerospace Research and Development, Paris (France).
**THE CONTRIBUTION OF SKIN BIOPSY TO THE DETECTION OF VASCULAR SENESCENCE, RELATIONSHIP WITH CAROTIGRAM**
C. F. Nogues, R. Carre, F. Lizeray, and E. Cava *In its* The Role of the Clin. Lab. in Aerospace Med. May 1975 9 p refs In FRENCH
Copyright.

The significance of the I/A ratio in the carotidogram was demonstrated, where I is the amplitude of the catacrotic incisure and A is the total amplitude of the curve. Studies performed with hydraulic models have shown that this ratio increases with the peripheral resistance and a decrease in the elasticity. This ratio was compared to changes in the skin microscopic structure observed following biopsies performed in the region of the posterior iliac spine, using data obtained from 93 aircrew members; a very close correlation was observed between the skin structure and the I/A ratio. It follows from this that the carotidogram may be used in studies of the arterial pulse and gives an indication of the biologic age. Transl. by Y.J.A.

**N76-27837*#** Lehigh Univ., Bethlehem, Pa. Center for Surface and Coatings Research.
**ELECTROPHORESIS EXPERIMENT FOR SPACE Final Report**
John W. Vanderhoff and F. J. Micale Apr. 1976 87 p
(Contract NAS8-28654)
(NASA-CR-149925) Avail: NTIS HC $5.00 CSCL 06A

The Apollo 16 electrophoresis experiment was analyzed, demonstrating that the separation of the two different-size monodisperse latexes did indeed take place, but that the separation was obscured by the pronounced electroosmotic flow of the liquid medium. The results of this experiment, however, were dramatic since it is impossible to carry out a similar separation on earth. It can be stated unequivocally from this experiment that any electrophoretic separation will be enhanced under microgravity conditions. The only question is the degree of this enhancement, which can be expected to vary from one experimental technique to another. The low-electroosmotic-mobility coating (Z6040-MC) developed under this program was found to be suitable for a free-fluid electrophoretic separation such as the experiment designed for the ASTP flight. The problem with this coating, however, is that its permanency is limited because of the slow desorption of the methylcellulose from the coated surface. Author

**N76-27838*#** Kanner (Leo) Associates, Redwood City, Calif.
**PRELIMINARY RESULTS OF AN EXPERIMENT ON HUMAN CHRONOBIOLOGY AND NEUROBIOLOGY IN A SUBTERRANEAN ENVIRONMENT. 1: LIFE ON A BICIRCADIAN RHYTHM (P. ENGLENDER). 2: LIFE IN CONTINUOUS LIGHT (J. CHABERT). LONGITUDINAL ANALYSIS AND COMPUTER CORRELATION OF NEUROLOGIC, PSYCHOLOGICAL AND PHYSIOLOCIG DATA COLLECTED IN BEYOND-TIME CAVE EXPERIMENTS FROM 1968-1969**
M. Siffre Washington NASA Jun. 1976 330 p refs Transl. into ENGLISH of "Convention de Recherche de la Delegation Generale a la Recherche Scientifique et Technique", DGRST-70/02/183 France p 1-346
(Contract NASw-2790)
(NASA-TT-F-15499; DGRST-70/02/183) Avail: NTIS HC $10.00 CSCL 06S

Two simultaneous experiments are described that give confirmation of the fact that human beings will spontaneously adopt a 48-hour sleep-wakefulness rhythm when placad under beyond-time conditions in a subterranean environment such as a cave. The time required for the onset of this rhythm varies with the individual, however; one subject achieved it in 15 days, while another did so only after three months. It was found that sleep requirements do not increase in proportion to the period of the cycle: on an average of 1/3 more sleep, it was possible to achieve more than twice the activity duration. Alertness was measured through various tests, including reaction time, grip strength, and dexterity, and these findings were correlated with various physiologic parameters -- most importantly, polygraphic recordings of sleep. Results indicate that there is no decrease in alertness on a 48-hour rhythm. Author

**N76-27839*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**A LOGIC-CONTROLLED OCCLUSIVE CUFF SYSTEM Patent Application**
Joseph T. Baker (Technol. Inc., Houston, Tex.), William W. Hursta (Technol. Inc., Houston, Tex.), and George W. Hoffler, inventors (to NASA) Filed 1 Jun. 1976 14 p
(Contract NAS9-13291)
(NASA-Case-MSC-14836-1; US-Patent-Appl-SN-691647) Avail: NTIS HC $3.50 CSCL 06B

The occlusive cuff system of this invention comprises a pressure cuff and a source of regulated compressed gas feeding the cuff through an electrically operated fill valve. An electrically operated vent valve vents the cuff to the ambient pressure. The fill valve is normally closed and the vent valve is normally open. In response to an external start signal, a logic network opens the fill valve and closes the vent valve, thereby starting the pressurization cycle. A pressure transducer continuously monitors the pressure in the cuff. When the transducer's output equals a selected reference voltage, a comparator causes the logic network to close the fill valve and start a timer. The timer, after a selected time delay, opens the vent valve to the ambient pressure, thereby ending the pressurization cycle. NASA

**N76-27840#** Oak Ridge National Lab., Tenn.
**HEALTH PHYSICS DIVISION Annual Progress Report, period ending 30 Jun. 1975**
P. T. Perdue and D. J. Christian 30 Jun. 1975 323 p refs
(Contract W-7405-eng-26)
(ORNL-5046) Avail: NTIS

A liquid organic scintillator, combined with solvent extraction techniques, can provide a sensitive means to measure small amounts of alpha-emitting heavy metals. Progress is reported on a recent effort to optimize both the detection system and the solvent extraction process for liquid organic scintillators. Radiation levels in human bone and tissue samples were monitored, and the applications of dosimetry to nuclear weapons fallout, nuclear reactor safety, and industrial safety are examined. NSA

**N76-27841#** Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
**SPACE SLED FACILITY, PHASE A Final Report**
Apr. 1976 135 p
(Contract ESA-SC/89-HQ)
(ESA-CR(P)-802) Avail: NTIS HC $6.00

A multipurpose facility called space sled is proposed for vestibular research on human and animal test subjects in Spacelab with the following characteristics: specially formed seat/platform for test subjects fixation suspended in a vertically mounted gimbal structure for test subjects positioning, guided by two rails mounted in front of each Spacelab rackside for safety reasons, and driven by electromotor via capstan drive. This facility provides various rectilinear and oscillating acceleration profiles for mechanical stimulation of the test subject. Provisions for mounting an optokinetic and caloric stimulation device are foreseen. With the proposed design, disturbing uncontrolled accelerations can be

prevented to a level of 0.001 g (0.01 g for constant g oscillation) theoretically as the analysis of the dynamic behavior of the structure and acceleration control system show. Author (ESA)

N76-27842# European Space Agency, Paris (France).
**SPACELAB AND ITS UTILIZATION FOR BIOMEDICAL EXPERIMENTS**
G. Seibert 1975 23 p Presented at the 18th COSPAR Meeting, Varna, Bulg., 29 May - 7 Jun. 1975
Avail: NTIS HC $3.50

Opportunities of using Spacelab for biomedical investigations are reviewed. Essential knowledge required is concerned with the performance of the vestibular balancing mechanism and the related problem of stomach awareness. Safety of the crew and their genetic cells in relation to cosmic radiation is considered vital. The effect of zero gravity on the cardiovascular system will be studied. Animals and plants will be included in the experiments. ESA

N76-27843# Minnesota Univ., Minneapolis. Lab. of Neurophysiology.
**DYNAMIC CHARACTERISTICS OF HUMAN MOTOR PERFORMANCE IN CONTROL SYSTEMS Final Scientific Report**
C. A. Terzuolo Aug. 1975 9 p refs
(Grant AF-AFOSR-1969-71; AF Proj. 9777)
(AD-A020662; AFOSR-76-0054TR) Avail: NTIS CSCL 06/16

The following Air Force research projects were reported on: Motor control; Data Processing by Small Neuronal Networks; Reflex Control of Respiration; Membrane Properties Leading to Repetitive Firing; Muscle Spindle Properties; and Decoding and Classification of Visual Patterns by Humans. GRA

N76-27844# Human Resources Research Organization, Alexandria, Va.
**A PARTIALLY ANNOTATED BIBLIOGRAPHY ON OPTIMAL WORK-REST CYCLES Consulting Report**
John D. Engel and Harold P. Bishop Mar. 1971 51 p refs
(Contract DAHC19-70-C-0012; DA Proj 2Q0-62107-A-712)
(AD-A020655) Avail: NTIS CSCL 05/10

A bibliography was undertaken to review those studies whose results would assist in the eventual selection of optimal work-rest cycles for specified types of performance. It became apparent during the literature search that only a few laboratory experiments clearly dealt with the work-rest cycling question. Hence, it was necessary to examine the results of a number of other studies which were less directly concerned with the question but were pertinent. In general, the studies were those in which observations of performance extended for a period of 24 hours or longer since it was felt that such a period of observation was the minimum necessary for valid applicability to the scheduling of work and rest over prolonged intervals. Author

N76-27845# Science Applications, Inc., El Segundo, Calif.
**EFFECTS OF SULFUR OXIDES ON THE LUNG: AN ANALYTIC BASE. PART 2: APPENDIX**
D. F. Hausknecht and R. A. Ziskind Sep. 1975 148 p refs
Sponsored by Elec. Power Res. Inst.
(PB-249685/9; SAI-75-566-LA-Pt-2; EPRI-205A) Avail: NTIS HC $6.00 CSCL 06T

Proceedings are presented from a workshop panel comprised of experts in sulfur oxide toxicology, pulmonary medicine, mathematical modeling of the respiratory system, including detailed morphometry, and cytology. Each of the reviewers was provided a copy of the report in draft several weeks before the workshop which was conducted November 25 and 26, 1974 at EPRI Headquarters in Palo Alto. The reviewers were requested to comment on the validity and adequacy of the approach described in achieving the goals stated in the report. The written reviews provided by the workshop participants are reproduced in this report. GRA

N76-27846# Advisory Group for Aerospace Research and Development, Paris (France).
**FOURTH ADVANCED OPERATIONAL AVIATION MEDICINE COURSE**
A. N. Nicholson May 1976 105 p refs Course held at Farnborough, England, 17-26 Jun. 1975
(AGARD-R-642) Copyright. Avail: NTIS HC $5.50

Various aspects of aviation medicine was studied in detail. Topics included the training of aircrew in aviation medicine, medical aspects of naval helicopter operations on the northern flank, developments in personal equipment with special reference to helmet developments, high speed escape and thermal problems, and the use of hypnotics in air operations.

N76-27847 Institute of Naval Medicine, Alverstoke (England).
**MEDICAL ASPECTS OF OPERATING ON THE NORTHERN FLANK OF NATO**
W. J. Blake *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 4 p refs

Pre-Arctic and survival training to achieve a higher standard of physical fitness required for Arctic service is described. Emphasis is placed on protection and the problems of operating in cold environments. Among the main topics discussed are: (1) environmental effects; (2) use of protective clothing; (3) use of shelter; (4) life style; (5) cold injuries and (6) survival techniques. B.B.

N76-27849 Royal Naval Air Medical School, Seafield Park (England).
**THE IMMERSION VICTIM**
F. St. C. Golden *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 6 p refs

The mechanisms involved in the training of rescue crews and the clinical management of the immersion victim are discussed. B.B.

N76-27850 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**MECHANICS OF HEAD PROTECTION**
D. H. Glaister *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 6 p refs

Various standards are discussed which cover three main aspects of helmet design, namely: (1) impact protection. The helmet is struck under controlled conditions against a first or hemispherical anvil and the transmitted force is measured; (2) penetration resistance. The helmet is struck against a conical anvil having a 0.5 mm radius tip; and (3) helmet retention. After a moderate preloading period, the strap is loaded progressively. It is further stated that the standards cover requirements for factors such as flammability, extreme cold, heat and humidity, and individual impact testing of padding materials. B.B.

N76-27851 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**AUDITORY COMMUNICATION**
R. G. Green *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 3 p

The problem of ambient noise in aircraft is discussed with direct relation to auditory communication and aircraft crew members. Predominant sources and nature of noise in high performance single and two seat aircraft, and propeller driven aircraft are listed. Possible solutions to reduce noise and enhance communication are reported. B.B.

N76-27852 Royal Air Force Inst. of Aviation Medicine, Farnborough (England). Applied Vision Section.
**EYE PROTECTION AND PROTECTIVE DEVICES**
D. H. Brennan *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 8 p ref

Major ocular hazards encountered in military aviation and some protective measures which may be adopted are discussed. The hazards considered are solar glare, bird strike, wind blast, miniature detonating cord, lasers and nuclear flash. Author

**N76-27853** Royal Air Force Inst. of Aviation Medicine, Farnborough (England). Flight Systems Section.
**HELMET MOUNTED SIGHTS AND DISPLAYS**
John Laycock *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 6 p refs

The possible applications of helmet mounted sights and displays are considered. Brief details of the software and hardware problems which may be experienced with such systems are given before outlining in more detail the psychological problems encountered. The manner in which the rate of visual information processing by the pilot may be increased by varying physical parameters is discussed. Author

**N76-27854** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**WARNING SYSTEMS IN AIRCRAFT CONSIDERATIONS FOR MILITARY OPERATIONS**
D. C. Reader *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 3 p refs

The principles employed in the design of warning systems in aircraft are presented. Visual, auditory, and tactile signals are discussed in detail. It is concluded that the concept of visual display combined in a sensory warning system is probably the most efficient method of presenting essential emergency information to the crew. It is further stated that apart from a few specific cases, audio warnings do not have distinct advantages over visual displays. B.B.

**N76-27857** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**PHYSIOLOGICAL LIMITATIONS TO HIGH SPEED ESCAPE**

David H. Glaister *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 5 p refs

The forces which must be imposed for satisfactory high-speed ejection approach, or even surpass, the limits of human tolerance at several stages in the ejection sequence are: (1) the +Gz acceleration of the ejection seat; (2) the -Gx acceleration due to wind drag; (3) direct (pressure) and indirect (flail) effects of wind blast; (4) other inertial forces (centrifugal, tangential) due to seat instability; (5) opening shock of drogue parachute and main canopy; and, (6) ground impact. Of these forces the first must be increased to achieve tail fin clearance at high speed, the second and third increase with the square of indicated air speed, the fourth increases with airspeed, and the fifth must be increased if escape is to be successful in the high-speed low-level case. Only the last force is uninfluenced by aircraft speed at ejection and the message is clear - high speed has a major effect on forces imposed during assisted escape from aircraft. These forces are considered in relation to the mechanism of injury, incidence of injury, tolerance to injury and in particular, to the influence of air speed at ejection. Author

**N76-27858** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**PRINCIPLES AND PROBLEMS OF HIGH SPEED EJECTION**
A. J. Barwood *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 4 p

The principles of ejection are described: to recover aircrew uninjured, which is best achieved by the use of as simple an escape system as technically possible. Once the system has been initiated all sequences automatically follow and there is no further action required by the ejectee until he is descending on a fully deployed parachute. The hazards of ejection and the development of the open ejection seat system up to the maximal capability are briefly described. The sequences of ejection on a typical Martin Baker Aircraft escape system are outlined to stress the simplicity, and therefore technical reliability, of this system as used in the majority or service aircraft in the UK Services. Author

**N76-27859** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**CURRENT AND FUTURE ESCAPE SYSTEMS**
D. C. Reader *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 2 p

The role of escape systems in fixed wing military aircraft is now well established. Almost all combat fixed wing aircraft in NATO countries are equipped with ejection seats and considerable effort is spent on improving the performance of these seats for future aircraft. Some of these areas where current escape systems are deficient and some ways in which future systems seek to overcome those deficiencies are described. Author

**N76-27860** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**HELICOPTER ESCAPE AND SURVIVABILITY**
D. C. Reader *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 2 p

Military helicopters are not equipped with ejection seats as are fixed wing aircraft. Escape systems are presented to fill the need for helicopter aircrew protection. A.S.K.

**N76-27861** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**THE PHYSIOLOGY OF HIGH G PROTECTION**
B. J. Lisher *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 2 p refs

The introduction of several new combat aircraft which have the structural integrity and the engine power to execute maneuvers at high levels of acceleration for considerable periods of time reintroduces the concept that certain operations, particularly air to air combat, may be physiologically limited rather than limited by aircraft design parameters. An acceleration level of 8G sustained for 60 seconds has been suggested as a point to which acceleration protection should be aimed, although higher G levels for shorter periods of time can be expected. Two methods of high G protection are presented, one using a reclining seat and the other using immersion of the body in water. Author

**N76-27862** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**A COMPARISON OF RECENT ADVANCES IN BRITISH ANTI-G SUIT DESIGN**
J. W. Davies *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 3 p refs

Comparisons in the field of a knee length anti-G suit and an external anti-G suit, with the standard British anti-G suit worn close to the skin, are described and the results discussed. Author

**N76-27863** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**THERMAL PROBLEMS IN MILITARY AIR OPERATIONS**

J. R. Allan *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 2 p

The thermal problems of an aircrew functioning in air operations over the full range of natural environments are discussed. A.S.K.

**N76-27864** Royal Air Force Inst. of Aviation Medicine, Farnborough (England). Cold Environment Research Section.
**OPERATIONS IN COLD ENVIRONMENTS**
P. Marcus *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 3 p

The incidence of cold stress in military aviation is discussed together with methods for overcoming the problems it poses, by cabin conditioning or by the use of insulating or heated garments. Protective clothing is also required by aircrew to aid survival in emergencies and the principles of its design are

considered. Lastly, an account is given of the RAF's permanent cold climate detachments and of cold weather operational and survival training. Author

**N76-27865** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**THERMAL PROBLEMS IN HIGH PERFORMANCE AIRCRAFT**
J. R. Allan *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 5 p ref

A general review of current thermal problems in high performance aircraft, their origins and current design trends in their solution is given. Author

**N76-27866** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**PERSONAL THERMAL CONDITIONING**
Craig Saxton *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 6 p

The inadequacy of cabin conditioning systems in high performance aircraft has resulted in aircrew being exposed to severe heat stress situations within the cockpit environment during certain flight profiles. To alleviate the physiological strain imposed upon the man, methods of thermally conditioning the micro-environment within flying clothing assemblies have been investigated and applied to operational situations. The cooling agents used in the personal thermal conditoning role have been air or water. The former has been utilized either as an evaporative agent or convective cooling agent. The relative merits of the different personal conditioning systems are discussed and a case made for the development of a practical liquid-cooled suit system for use in present and future high-performance aircraft. Author

**N76-27867** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**CABIN PRESSURISATION AND OXYGEN SYSTEMS-REQUIREMENTS**
J. Ernsting *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 5 p refs

The considerable interactions between the physiological requirements for cabin pressurization and the relationship between concentration of oxygen and cabin altitude required of oxygen delivery systems for aircrew in flight are explored. Although work performed until 1960 suggested that hypoxia induced by breathing air at altitudes of up to 8,000 feet was acceptable, investigations performed more recently at RAF IAM and elsewhere suggest that the maximum acceptable degree of hypoxia for aircrew in flight is that associated with breathing air at 5,000 feet. The incidence of hypoxia due to malfunction of oxygen delivery equipment and of decompression sickness at altitudes above 20,000 feet is such that the maximum cabin altitude in combat aircraft should not exceed 20,000 to 22,000 feet. The concentration of oxygen which must be breathed to avoid transient hypoxia on sudden failure of a pressure cabin even when 100% oxygen is delivered to the respiratory tract immediately the decompression occurs is generally greater in high differential pressure aircraft than that required to prevent significant hypoxia with the pressure cabin intact. Even in modern combat aircraft this consideration requires a higher than 5,000 feet equivalent breathing mixture at aircraft altitudes greater than 35,000 feet. Author

**N76-27868** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**SEAT MOUNTED OXYGEN REGULATOR SYSTEMS IN UNITED KINGDOM AIRCRAFT**
A. J. F. MacMillan *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 2 p

The rationale for mounting a demand oxygen regulator assembly on the ejection seat of combat aircraft is described. The special facilities which have been incorporated in systems used in the Royal Air Force by utilizing the advantages of seat mounting are discussed and it is considered that the system provides true duplication of essential components, allows very simple crew drills and reduces aircraft servicing penalties in the event of malfunction of the regulator package. Author

**N76-27869** London Hospital Medical Coll. (England). Pharmacology Section.
**ABSORPTION, METABOLISM AND EXCRETION OF HYPNOTIC DRUGS**
Stephen H. Curry *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 7 p refs

Absorption, metabolism and excretion are the processes which govern the growth and decay of plasma concentrations of all drugs, including hypnotics. Variations in plasma concentrations lead to corresponding variations in effect, although the exact detail of the relation between level and effect is more complex than is implied by this statement. Existing data on absorption, metabolism and excretion for the various hypnotic drugs are of variable detail. Total absorption of oral doses is generally believed to occur, although when systematically examined, absorption has sometimes been found to be incomplete. Metabolism occurs by a variety of reactions, but only occasionally to pharmacologically-active compounds. Excretion is of both unchanged drug and metabolites in bile and urine. These events and processes as they relate to hypnotic drug actions are considered in detail. Author

**N76-27870** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
**RESIDUAL EFFECTS OF HYPNOTICS**
A. N. Nicholson *In* AGARD 4th Advanced Operational Aviation Med. Course May 1976 8 p refs

The residual effects of hypnotic drugs after their therapeutic purpose is fulfilled was considered. Test subject motor skills were examined for residual effects using a method of adaptive tracking. A.S.K.

**N76-27871*#** Baylor Univ., Houston, Tex. Psychophysiology Lab.
**PSYCHOLOGICAL AND PHYSIOLOGICAL CORRELATES OF STRESS: PERFORMANCE ON A COOPERATIVE TASK Final Report**
Robert Roessler, Jerry Lester, and Ted Knapp 2 Jun. 1976 50 p refs
(Contract NAS9-13452)
(NASA-CR-147819) Avail: NTIS HC $4.00 CSCL 05E

The relationship of personality dimensions to performance was investigated. The personality measure used to select subjects, the Barratt impulsiveness scale, is hypothesized to be related to a style of behavior which should affect the trend of choices which various subjects will make. Personality dimensions were specifically examined during performance of a cooperative task, the Prisoner's Dilemma. Author

**N76-27872#** National Academy of Sciences - National Research Council, Washington, D.C.
**GUIDELINES FOR DEVELOPING A TRAINING PROGRAM IN NOISE SURVEY TECHNIQUES Final Report**
William Gately, Paul L. Michael, and George W. Kamperman Jul. 1975 34 p refs
(Contract N00014-67-A-0244-0021)
(AD-A016677; EPA-550/9-75-021) Avail: NTIS CSCL 05/9

The report contains guidelines for the content, format, organization, and administration of a training program for noise survey technicians. It is intended to provide assistance to state and local governments in setting up a training program for training technicians to assist in the enforcement of noise ordinances and investigation of noise complaints. The program is directed toward trainees with a minimum of a high school education and no previous experience in acoustics. The report outlines and explains material to be covered in a 4 1/2 day training program. Author

**N76-27873#** San Diego State Foundation, Calif.
**SELF-REGULATION AS AN AID TO HUMAN EFFECTIVENESS AND BIOCYBERNETICS TECHNOLOGY AND BEHAVIOR Annual Report, 1 Jul. 1974 - 31 Dec. 1975**
Robert L. Benshoff Jan. 1976 45 p refs
(Contracts N00014-70-C-0350; N00014-76-C-0185; ARPA Order 1595; ARPA Order 3065)
(AD-A021105) Avail: NTIS CSCL 05/10

This report includes a summary and overall conclusions from the 5-year research program concerned with self-regulation as an aid to human effectiveness. While the findings clearly demonstrated that self-regulation of most physiological variables were possible, the control of these various physiological measures did not consistently lead to enhanced performance. The report also includes the current subcontracts awarded under the Biocybernetics Technology and Behavior program. The research goals and first year's progress of each subcontractor are also presented. GRA

**N76-27874#** New Mexico State Univ., University Park. Dept. of Psychology.
**DIMENSIONS OF PERFORMANCE ASSESSMENT AND SKILL DEVELOPMENT Final Annual Status Report**
Warren H. Teichner 30 Oct. 1975 16 p refs
(Contract F44620-71-C-0072; AF Proj. 9778)
(AD-A021100; AFOSR-76-0052TR) Avail: NTIS CSCL 05/10

The research goal of this contract was the development of techniques which might be applied to complex flight trainers on-line to provide: (1) diagnostic measures of learning difficulties and (2) remedial steps to overcome the difficulties. Three phenomena -- response blocking, filtering and queuing -- appeared to be especially useful as a source of diagnostic measures. In the latter case, the signals become lost or distorted. All three phenomena are well-known as detrimental stress responses in the learning of complex tasks. It appears that response blocking may occur whenever there is a competition either between (1) processes which are required to act upon the same data or between (2) responses to the output of a single process when, in each case, the competitive elements can only operate one at a time. Within the general theoretical framework, the most important competitive processes are: storing in short-term memory vs. retrieval from short-term memory; retrieval from short-term memory vs. translation from one stimulus code to another; and translation from one stimulus code to another vs. translation from a stimulus code to a response code. GRA

**N76-27875#** Navy Personnel Research and Development Center, San Diego, Calif.
**AN EVALUATION OF COMPUTERIZED TESTS AS PREDICTORS OF JOB PERFORMANCE. 2: DIFFERENTIAL VALIDITY FOR GLOBAL AND JOB ELEMENT CRITERIA Final Report 1 Jul. 1972 - 30 Jun. 1973**
Charles H. Cory Jan. 1976 59 p refs
(NR Proj. 150-335; RR0420401)
(AD-A020867; NPRDC-TR-76-28) Avail: NTIS CSCL 05/10

The report presents data concerning the validity of a set of experimental computerized and paper-and-pencil tests for measures of on-job performance on global and job elements. It reports on the usefulness of 30 experimental and operational variables for predicting marks on 42 job elements and on a global criterion for electrician's mate, personnelman, sonar technician, and apprenticeship rating groups. GRA

**N76-27876#** Minnesota Univ., Minneapolis. Dept. of Psychology.
**A SIMULATION STUDY OF STRADAPTIVE ABILITY TESTING**
C. David Vale and David J. Weiss Dec. 1975 61 p refs
(Contract N00014-76-C-0243; NR Proj. 150-382; RR0420401)
(AD-A020961; RR-75-6) Avail: NTIS CSCL 05/10

A conventional test and 2 forms of a stradaptive (stratified adaptive) test were administered to thousands of simulated subjects by minicomputer. Characteristics of the three tests using several scoring techniques were investigated while varying the discriminating power of the items, the lengths of the tests, and the availability of prior information about the testee's ability level. The tests were evaluated in terms of their correlations with underlying ability, the amount of information they provided about ability, and the equiprecision of measurement they exhibited. The major findings are listed. GRA

**N76-27877#** Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
**PROCESSES IN ACQUIRING KNOWLEDGE Semiannual Technical Report, 15 Sep. 1975 - 30 Mar. 1976**
Allan Collins Jan. 1976 63 p refs
(Contract N00014-76-C-0083; ARPA Order 2284; NR Proj. 154-379; RR0420401)
(AD-A020270; BBN-3231; SATR-1) Avail: NTIS CSCL 05/9

The objective of this paper is to develop a theory of Socratic tutoring in the form of pattern-action (or production) rules for a computer program. These pattern action rules are being programmed on a computer system for tutoring causal knowledge and reasoning. The production rules were derived from analysis of a variety of tutorial dialogues. The analysis accounts for the specific teaching strategies used by the tutors in the dialogues within a content-independent formalism. The paper includes twenty-three production rules derived from the data analyzed. GRA

**N76-27878*#** Joint Publications Research Service, Arlington, Va.
**MAN, THE BIOSPHERE, AND SPACE**
Nikolay Aleksandrovich Agadzhanyan Washington NASA Jul. 1976 17 p refs Transl. into ENGLISH from Priroda (USSR), no. 4, Apr. 1976 p 4-13
(NASA Order W-13183)
(NASA-TT-F-15495) Avail: NTIS HC $3.50 CSCL 06S

Several medical and biological problems in the flights of the manned space stations are discussed, including the different atmospheres used in U.S. and U.S.S.R. spacecraft, the problems of transferring crew members between the Soyuz and Apollo spacecraft with the different atmospheres, the microbe exchange and fungi experiments on the Soyuz-Apollo mission, and physiological problems on long space flights, including details for the Russian cosmonauts who were on the Soyuz-Apollo and the Soyuz-Salyut flights. Possible applications of the results of space medical research to terrestrial health problems and the future possible colonization of interplanetary space are also discussed. Author

**N76-27879*#** Scientific Translation Service, Santa Barbara, Calif.
**LIVING AND WORKING IN SPACE**
L. A. Gilberg Washington NASA Jul. 1976 71 p Transl. into ENGLISH of the mono. "Novoye v Zhizni, Nauke, Tekhnike. Seriya Kosmonavtika, Astronomiya, No. 12: Zhizn i Rabota v Kosmose" Moscow, Znaniye Press, 1975 p 1-63
(Contract NASw-2791)
(NASA-TT-F-17075) Avail: NTIS HC $4.50 CSCL 05E

Man's work in space has a number of specific characteristics and occurs under extremely unusual conditions: in weightlessness, with large g-forces, in the absense of an atmosphere. The problems of human adaptation to such conditions and to questions of the life support system of cosmonauts are discussed. A number of developments in this field in the U.S.S.R. and abroad are given. Author

**N76-27880*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
**REAL-TIME DETECTION AND DATA ACQUISITION SYSTEM FOR THE LEFT VENTRICULAR OUTLINE Ph.D. Thesis - Stanford Univ.**
Johan Hendrickus Christiaan Reiber Washington Jun. 1976 311 p refs
(NASA-TR-R-461; A-6292) Avail: NTIS HC $9.75 CSCL 06P

To automate the data acquisition procedure, a real-time contour detection and data acquisition system for the left ventricular outline was developed using video techniques. The X-ray image of the contrast-filled left ventricle is stored for subsequent processing on film (cineangiogram), video tape or disc. The cineangiogram is converted into video format using a

television camera. The video signal from either the TV camera, video tape or disc is the input signal to the system. The contour detection is based on a dynamic thresholding technique. Since the left ventricular outline is a smooth continuous function, for each contour side a narrow expectation window is defined in which the next borderpoint will be detected. A computer interface was designed and built for the online acquisition of the coordinates using a PDP-12 computer. The advantage of this system over other available systems is its potential for online, real-time acquisition of the left ventricular size and shape during angiocardiography. Author

N76-27881*# Joint Publications Research Service, Arlington, Va.

**IN UNEXPECTED SITUATIONS: COSMONAUT TRAINING**

N. Fefelev Washington NASA Jun. 1976 8 p ref Transl. into ENGLISH from Aviat. Kosmonavt (USSR), no. 5, May 1976 p 40-41

(NASA-TT-F-17078) Avail: NTIS HC $3.50 CSCL 05H

Unexpected spacecraft flight emergency situations that can occur were tackled by a ground central backup crew personnel. Simulated malfunctions on a spacecraft mockup were performed and recommendations were radioed to an orbiting crew. Specifically, the Apollo-Soyuz space mission is given as an example, and the emergency procedures followed during that mission are reviewed. Topics discussed are: (1) use of hypnosis to combat space flight fatigue, (2) use of stimulants to combat space flight fatigue, and (3) psychophysiological factors that influence work capacity and mental alertness in performing such functions as stellar navigation, control and communications, and meteorological tasks. Author

N76-27882# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost.

**AIR PASSENGER COMFORT. A STUDY ABOUT COMFORT IN GENERAL AND FOR AIR PASSENGERS IN PARTICULAR**

G. B. M. Mathot Nov. 1975 33 p refs

(FOK-K-66a) Avail: NTIS HC $4.00

A model for air passenger comfort to be used by aircraft designers and manufacturers is defined. The model takes into account elements such as noise, side to side motion, and aesthetics; relations between these elements; and processes such as influence of civilizations, social groups, marketing, and pressure groups. Recommendations for further research and design improvements are suggested. ESA

N76-27883# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).

**THE USE OF TRITIUM GAS IN LIGHT SOURCES**

J. B. T. Aten Aug. 1975 25 p refs In DUTCH; ENGLISH summary

(Contract A73/KL/048)

(MBL-1975-18; TDCK-66735) Avail: NTIS HC $3.50

Radioactive luminous paints have frequently been used for the illumination of objects like dials and pointers. For some years new light sources, known as betalights, became available. Military applications of these betalights are known and are to be expected at a large scale in the future. Attention is given to the radiological health implications of these light sources, proposals for health physics measures are given, and the way in which legal regulations can be satisfied are discussed. Author (ESA)

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